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FROM TIFLIS TO TIBET.

BY

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My stay at Tiflis is notable in memory for one loss and one gain. The loss was my illusion concerning the beauty of the Georgian women; they are comely, with symmetrical features and dark complexion, and they are prettily gowned; but one begins already, even in this rather superior Asiatic type, to miss that fineness of feature and expression to which the high development of feminine beauty in Europe and America has accustomed us. Early travellers who have rhapsodized over these and other Eastern women may have been somewhat affected by the fact that they approached them much more laboriously and tardily than is now necessary. To-day Tiflis may be reached in four or five days' railway journey from Paris, with but a two-days' drive over the Caucasian Mountains from Vladikavkaz. Thus the Caucasian beauty is put into immediate juxtaposition in one's mind with the more perfect type in France. My gain at Tiflis consisted in a companion, (Captain Anginieur, of the French Army), who was about to go upon a railway journey in Asia Minor and the Turkestan region, and, becoming much interested in my plans for venturing into Tibet, he obtained permission from Paris to accompany me, and did so to the end.

Knowing that the approach from the south through the Bhutanese, Sikkim, and Nepal territory was impossible by reason of the objections of the people and the agreed policy with them on the part of the British Government to prevent incomers from passing their territory, and learning from Mr. Rockhill, our American authority on such questions, that, in his judgment, the eastern approach to Tibet from the interior of China was still an impossible one by reason of

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the Boxer troubles, it became necessary to consider the northern approach. Because of the very great width of the Gobi Desert,—stretching over one-half or more along the northern line of Tibet, it seemed the most arduous route would be that, leaving the Trans-Siberian Railway at any convenient point, such as Irkutsk. Hence, one is brought around to the Trans-Caspian Railway and the approach through Russian Turkestan over the Alai Mountains into Chinese Turkestan; thence climbing the Kuenlun Mountains at some point; thence to venture upon the great high desert of Northern Tibet. With this route then in view we crossed the Caspian Sea to Krasnovodsk, the western terminus of the Trans-Caspian Railway, and there I was delighted to learn that a small private car had been placed at my disposal by the authority of the Russian Minister of Railways at St. Petersburg—a courtesy which it is my pleasure to acknowledge, since it seems to have been granted solely by reason of the representations made by our Embassy at St. Petersburg.

The long, hot, dusty journey over the blank deserts is first relieved by the passage of the Amu Daria—the ancient Oxus—but the first point at which we thought it worth while to stop was Bokhara, a city renowned for ages in the history of Central Asia, and, until very recently, closed to Europeans. The people are still very fanatic Mohammedans, but as their state is now protected by the Russian power, it is possible and entirely safe to go anywhere in its crowded bazaars.

Next comes the lordly Samarkand, once the capital of Tamerlane, and the site of the only considerable architectural monuments which we meet in Asia until we reach China on the one hand or India on the other. The most beautiful structure left here by the great conqueror is one dedicated to the memory of his wife—of his favorite among many. The thought of it came back to me when, months later, I worshipped the beauty of the Taj Mahal, at Agra, in India. Here again was a woman's tomb, witness of an Emperor's love—a love won in fair competition. Thus, in polygamous Asia, the two most splendid monuments built by man declare the influence of woman. Then the system cannot be altogether destructive of her happiness, her value in life. After Samarkand, Andijan, famous only because a few years ago some ten or twelve thousand people were destroyed by earthquake. Its houses still are found in the ruins which, however, the industrious Russians are sweeping away for rebuilding, as Andijan is now a terminus of the Trans-Caspian Railway, 1,500 miles from the Caspian Sea. A day's drive brought us to a post where the Russian commanding officer permitted us

to start away with the modest outfit of nine ponies hired to carry us as far as Kashgar, twelve days' journey over the Alai Mountains into Chinese Turkestan.

Kashgar, Yarkand, and Khotan—these are the three great towns which one passes skirting the Taklamakan Desert. Passing through artificial oases which irrigation has produced and which are studded along the blank desert sands where they crowd upon the cultivated fields and in times past have destroyed more than one populous city, we reached Kashgar. Here we reorganized our caravan completely, purchasing some ponies and hiring new men. The very difficult question of an interpreter came before us and never received a satisfactory solution. The natives speak the general Turki tongue, which holds all over Central Asia. One European tongue—Russian—is now and then heard in the mouth of an officer's servant. As we knew only two languages—English and French—our state was very trying. At the last moment, however, a boy of seventeen appeared and paraded a vocabulary of something like twenty-five words of English, which he had learned from a Swedish missionary. Had we not been quite desperate it would have been folly to engage him, but under the circumstances it was a necessary step, promptly taken.

In all the preparations here we were very much aided by Colonel Miles, the sole Britisher to be found in all the vast regions of Central Asia, there to represent as best he may, against the preponderating influence of the Russian Consul, the dwindling commercial interests of India. The presence of sixty Cossacks as a Consular guard, together with the knowledge on the part of the Chinese officials, that there are many other robust soldiers on the other side of the Alai Mountains, gives to the Russian official at this station an authority which is a certain humiliation to the Chinese Taotai who administers this region.

At Khotan I became the fortunate possessor of a lot of precious ancient manuscripts,—a portion of those extraordinary finds which began with Sven Hedin and almost ended with the wholesale work of Dr. Stein, sent from Calcutta for that purpose. It is highly probable that all save the pieces which I brought back will find their way into European libraries, and my gratification was considerable, therefore, in being able to place in our own Congressional Library and at the disposal of American scholars what are probably specimens of the oldest paper bearing written characters in the world. There are Egyptian and other papyrus documents that are older; but there is a certain interest attaching to these finds, aside from their nature as records, in that the material is ordinary Chinese paper preserved

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for probably 1,500 years or more under the dry sands which, at some far day, were swept over cities which were then flourishing Buddhist communities, and have there lain, until the keenness of the European for this sort of thing and the excavation done by the explorers above mentioned have caused the past to reveal itself in the most interesting fashion. Portions of these manuscripts which are in Europe are being slowly deciphered, and they are found to contain Sanskrit, which is, of course, familiar to students, and two other languages which are known merely as Central Asian languages now extinct. One has been deciphered by Dr. Hoernle, of Oxford, and he will in time, with such assistance as may come to him from other students, go over the whole mass. These are striking evidences, since they come from distances of something like 150 miles north of Khotan, of the wider extent of cultivated area, or, rather, the wider extent in which oasis-making was possible in the early part of the Christian Era. This shrinkage of the habitable area, due to the filling of the irrigation ditches, the change in the direction of streams, and the overwhelming of houses by sand, is a key to some of the riddles of those migrations which were so important eventually in determining the development of Europe itself, and, hence, of America. Neither in Yarkand nor Khotan is there any European resident; nor had there ever been, so far as I know, an American in Khotan, although a number of Europeans have made the city within the last ten years fairly familiar to students of travel. Here we said good-bye to the last courteous Chinese official with whom we had to deal and were off for Polu, a little village lying at the foot of the Kuenlun Mountains, visited in the past by four white men, and the scene of two unsuccessful efforts (ours making the third) to use it as a point of departure for any long journey across the Tibetan desert. We obtained, without much difficulty, our supplies of grain. These were loaded chiefly upon a donkey caravan which was to go up to the top of the plateau, thus relieving our own sixteen ponies from a large part of their burden while climbing the terrible path by which alone one can ascend to the great plateau above. We also engaged, without difficulty, eight or ten assistant caravan men to help our five regular servants who had been engaged in Yarkand, the duty of these assistants being as head-and-tail men for our ponies. A guide (so called) was also forthcoming; not that any one could carry us far on the journey we expected to make (which was across an unknown country and an uninhabited land), but that he undertook to place us three or four days' march on top of the plateau, where we hoped to identify our position by the scant material afforded in ex-

isting maps. At the end of the four days' terrific struggle we had reached the first goal of our ambition—the great upland. The donkey caravan had not appeared at all, and the eight assistant men had quietly dropped out of the way a day's march ahead of our arrival at the top, thus putting an almost impossible burden upon our five faithful men. We sent back for the donkey caravan, which was never seen. A portion of the grain was found thrown on the side of the trail and a sheep which we had bought was found killed. Our men brought back the grain which they found and we had to determine whether we could start out with our reduced supply, for the nearest point (Rudok) was yet twenty days' march away. At Rudok I had hoped, if we were forced to reach it, to get out of the way of the Tibetans and possibly to make some distance further east, although at no time did I feel it possible to reach Lhasa itself, whose closed gates could be opened only by force or fraud. Our caravan-bashi (leading man), a most excellent fellow, thought he could pull the caravan through to Rudok, although the horses must suffer; so off we started. The surly guide seemed to be ill, but he may have deceived us. After two or three days he slipped the bonds which tied him to one of our men at night and disappeared. This attachment to Mir Mullah, a faithful Afghan, was of course a forced one on the part of the guide. It was due to experiences in Africa, and in other unexplored countries, where the natives wisely refuse to accompany white men into lands where they are not wanted. It was, once more, a very grave matter for us to determine whether we should return or try to press on. The thought of the frightful descent of the mountain, the feeling that probably we should never fare better than we had fared at the hands of the Polu authorities, and a general desire not to give in without a fight, decided us in the end to push on. Those were weary days that followed; there was the long search for water, the deceit of the mirage, and after ten or fifteen days the failure of the ponies to bear the rigours to which they were exposed; temperatures of about 25 degrees Fahrenheit below zero at night, borne wholly without protection, and the long day's work under load with a ration constantly diminished as we saw that we were not finding a trail, caused the poor beasts, one by one, to drop by the wayside. We managed to keep going ourselves in pretty good health, although my European companion was badly affected by the extreme altitude which is maintained at substantially 16,000 feet, with occasional rise to 17,000 and 18,000 feet, over so many hundreds of miles of this vast and desolate land. Fuel was supplied by scanty grass roots, or the dung of wild yak, which here and there find herbage in the folds

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of the mountains. There was, of course, never enough for heating our bodies, but, very frequently, we were successful in getting a supply to make hot tea, through which alone we were kept alive. The men had for food simply the tea and their bread. We had our bread and tea, and, besides, a supply of Russian canned goods, ungrateful to the taste, but satisfactory as sustenance. The excessive cold made sleep difficult, yet, altogether, the conditions were not such as to militate severely against health. Illness came to Captain Anginieur through his inability to breathe without opening the mouth in these thin airs; that caused fever, and for a time I feared that my poor skill would be wholly ineffective to deal with his malady. However, one way or another, we came finally to a point in a maze of mountains, where it was evident that we must change the ordinary routine, or at once give up any hope of coming out. We, therefore, abandoned a considerable part of our luggage and stopped feeding such horses as were thus relieved. Four or five days of this brought us eventually to a standstill, due to the fact that we had, at an elevation of 18,500 feet, found ourselves unable to see any way ahead that did not involve such terrific climbing of mountains as would undoubtedly within two or three days bring us all to death. Two bushels of grain remained and eight horses out of sixteen. We then retreated down a valley which we had ascended in the hope of finding some way out of the trouble, stopped at a place where water was abundant and where some grass offered itself, and sent out two of our men with the last two ponies which could bear burdens and the last bushel of grain. If they could find succour we were saved; if not, nothing remained except to die. We had food for the five of us in camp for something like fifteen days. At that time we had seen no human being for a period of about twenty-five days. In nearly every direction it was evidently impossible that any headway should be made. Our two trusty envoys had the good sense to follow down a valley in which we had travelled for some days, and we were left to chew the cud of patience as best we could. These men had thought they recognized some landmarks, as both of them had accompanied earlier travellers going out from Western Tibet, and they believed that we were within three or four days of some sort of habitation, and that they would, therefore, undoubtedly return in five or six days at the most. The event proved that we were all very badly out of our reckoning, for day after day passed, and when the tenth day came, upon which we had agreed that if they found no help they should nevertheless return, our hearts sank slowly. The case was particularly trying on Anginieur, who was stricken

with phlebitis—unable to walk more than fifty feet at a time. The eleventh day came and we had determined to stay a few days longer and then resort to eating the horses, several of which had thoughtfully died, in order to prolong still further the possibility of rescue. Our proper food was diminished in quantity so that we then, in addition to a small bread supply, had between us one box of sardines for breakfast and one for dinner. Secure under an armour of thick ice there swam a few fish, which we finally endeavored to trap. Quite without hope of doing any damage to these creatures and only to pass the weary hours, on the 11th day I took a gun and fired idly at them. In a minute came what at first might have been taken as an echo of the shot fired, but when repeated, it could mean but one thing—that our men were returning. Then there followed half an hour of doubt as to whether they came empty-handed and impotent to relieve us, or whether they might indeed have found succor. When, in the distance, we saw two figures briskly trotting up the bleak valley our hearts bounded, for it meant that those two ponies could not be the same which had gone away on one bushel of grain. New ponies meant men, and men meant safety. Ere long it was all cleared up. Our faithful Mohammed Joo and Lasso returned and at their heels a little relief caravan of Kirghiz, the only human beings doubtless within two or three hundred miles in any direction; and by something better than chance—by the common sense of our men—these had been found; since the valley had been followed for 125 miles, barren and dreadful as it was, until it yielded what we above all things desired—a human habitation. Three Kirghiz tents had been discovered. They could give no help at once, because their men were absent, but two days further on Mohammed Joo found the head man of the settlement, a relief caravan was hastily organized, and then at the end of eleven days of suspense these good people came to save our lives. After the relief, all distinctions for a time between sahib and servant disappearing in the general joy, came the question as to whether we could resume our march eastward and southward. The Kirghiz were firm against it; their meagre supplies made it impossible that they should do more than take us back to their own tents; and, moreover, they were as ignorant as we of the uninhabited and impassable country which lay south and east of us. Glad to be relieved from death, but sorely disappointed at the necessity of turning back, we began our march to the Kirghiz tents. Anginieur was trussed up on a horse, and, to our delight, it was found that he could bear the saddle without much pain. Gradually his ability to use his leg increased, and at the end

of a week or ten days he could walk fairly well. There stretched before us twenty odd days of hard march before we could reach a village, and in these twenty days we passed only the three huts of the Kirghiz, who had relieved us, and one other. We were taken over the world-old Karakorum route, which joins Yarkand in the lower desert with Leh in the Ladakh country. Mountain passes, several of which were 18,000 feet high, marvellous peaks towering far above them, great glaciers occupying them, steep descents flanking them—every condition which, by European engineers, would be declared to constitute an impracticable route is found on this caravan trail over which during 2,000 years or more the patient Asiatic has won his way for commerce, for religion, now and then for war. Between two of these great passes, Saser and Kardong, there is found the Nubra Valley. Here, Lamaism, protected by Saser's snows on the one hand and Kardong's glassy slopes on the other, continues to turn its prayer-wheels, wave its myriad supplicating flags to the passing breeze, to sound its deep-toned prayer drums, to build prayer monuments more numerous than the very men themselves, and to lead a quiet life unknowing of all the busy world to which we belong. Tibet is made up of such valleys, but they are not to retain their peace.

As a geographical result of our journey, we were able to place two considerable lakes on the map heretofore blank, and to determine the head waters of the Karakash, a great river which flows down into Chinese Turkestan and becomes a part of the Tarim River system. The general character of the Aksaï Chin, or White Desert, whose unknown sands we thus traversed, is also determined, and particularly were we able to correct the surmises as to the direction of the mountains. Instead of finding them across this desert north and south as heretofore indicated, we travelled constantly between two roughly parallel ranges stretching east and west. While we were thus unable to reach far into the mysterious land which had beckoned us on, we were able to make this small contribution to the map maker's store.

Among the social institutions which have particularly attracted men's thoughts to Tibet is the strange marriage custom known as polyandry—one wife having several husbands, thus sharply distinguishing this custom from polygamy, so widely spread over Asia, including even Tibet. When brought face to face with these social institutions, so different from our own, many thoughtless people dispose of the whole matter by a general condemnation. As a matter of fact, the marriage institution, like all other important

social developments, is founded largely upon the relation of man to the soil. This relation is the fundamental one of all. Carried, as we are by the development of art in a favoured country, far beyond any ordinary consideration of the brutal problem of how to get something to eat, we are apt to lose sight of the fact that this is indeed the radical question which the race must meet, and all social institutions will yield to it, for they must. In Tibet the amount of arable land is exceedingly small, nor is this small area generally arable by nature. The people who are not nomads are those who have been able to build up on the Himalaya slopes a little battlemented field, held in place by stone fences and irrigated by a ditch from some rapid mountain stream. Placed, as they are, at the world's summit, none of them living at an elevation less than 10,000 feet, all of them between this elevation and say 14,000 feet, beyond which fixed habitations seem to be impossible, these people are situated as though their meagre land were the whole world. There is no elbow-room—substantially, they are locked in a snow-prison. For centuries they have struggled with Nature in her most rigorous mood. Now, when a family generations and generations ago was able to obtain possession of a certain amount of reclaimed mountain side, it became highly important that this should not be subdivided and that the number of people depending upon the scanty field for subsistence should not increase. The Malthusian doctrine, obscured as it is is in the land of plenty, here works promptly to a conclusion in the establishment of a very special marriage relation, as found, indeed, in other parts of the world, in sporadic fashion, but never so completely marking a large organization as here; and this unique institution is founded upon the very unique conditions which I have just described. Let us say that three brothers are born into a family. The patrimony must be kept intact, not merely because it is already laid out in certain special rock-ribbed fields, which are not themselves easily susceptible of division, but because in a system of irrigation the relation of a given amount of property to the ditches must be maintained and it becomes substantially impossible to subdivide in the way offered in open countries, such as those with which we are familiar. The elder brother then selects a wife. She becomes the wife of the family of sons who have inherited their patrimony. In this there will be nothing shocking if we are accustomed to it. The one woman, of course, will not bear more children than one woman can bear. There is, consequently, a very serious check upon the population, which check is of the utmost importance, if the race is to be maintained in any sort of hardi-

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ness. If a low birth rate is not in some way secured then must follow a very large mortality among children, if they are born out of proportion to the possibilities of sustenance. The surplus of women produced by such a system is, in part, taken up by the large nunneries which the Lama religion has taken from Buddhism, of which Lamaism is but a somewhat degraded form. The doctrine insists upon an asceticism which Europe has quite outgrown, and which probably in no country in the world can be found of long duration unless, as in Tibet, the conditions are such as to make impossible a large increase of population. There is also in Tibet a very large withdrawal of men to the monastic life; hence the number of births is held within such limits as permits the society to maintain itself substantially at a fixed level, save when disturbed, as it has been, by wars. Such fluctuations, as is well known, when due to violence, are gradually corrected and the original level is restored. With polyandry and polygamy, as with any other important institution, the relations to other conditions controlling the society must be carefully studied, not only before we blame, but before we determine that this or that social institution is not indeed well fitted to the other relations which the society must sustain. Perhaps the one respect in which those who travel among primitive peoples may be found to differ most markedly from those who do not is in their larger sympathy and charity for variations from our assumed normals.

The introduction of our arts, which it seems we shall force upon the Tibetans, may render unnecessary the maintenance of a system which is repugnant to our habitual conceptions in regard to marriage.

To illustrate further the connection of this system with property relations, it should be added that when a man establishes himself independently of his brothers in some new holding, he is quite free to break away from the family marriage and take a wife of his own. Polygamy is also found when occasional wealth prevails. It has been thought, in addition to the powerful causes operating out of the land system, that in the earlier days of Tibet before villages were scattered over its area many women were, necessarily, left alone if they had but one husband, since agriculture, and particularly grazing, was carried on at considerable distances from the home, and it is probable that the security offered by the assured presence of a man in the house to protect the woman, helped to strengthen the polyandric custom when it was a young and growing one. That these long and periodic absences of men who inhabit such countries and who must undertake even the peaceful pursuit of agriculture in a sort of warlike fashion, had, indeed, great effect upon the social

arrangements, is beyond doubt; and we may, therefore, consider that all these forces have co-operated to produce the existing institution of polyandry.

To summarize: the poverty of the land making it impossible that population should rapidly increase, the relative indivisibility of the land constituting a patrimony, and the enforced absence of the husband exposing the wife to danger,—these are the three elements which probably have set up the institution of polyandry. It is fair to add to the statement of the case that women have, perhaps by virtue of this institution, always played a large part in the family and even the national life of the Tibetans; the individual woman is as free as she is in our own countries, and, so far as observation can go, is as self-respecting and as much respected as the women in our own country.

With regard to the exclusion of Europeans, we are to remember that, as early as 1325, European travellers passed through Tibet, and that a number of them have remained for long periods at the very capital so recently considered as the inaccessible Lhasa. Christian missions were in Lhasa; from 1716 to 1729, under one leadership, and another from 1719 to 1735. An English traveller visited Lhasa in 1811; and in 1845 Père Huc reached Lhasa, and at the end of two or three months was sent away by the Chinese officials there residing; for China has, for many centuries, exercised a suzerainty over the Tibetan country, sometimes rudely shaken by disorders within China, but always renewed when some strong hand had grasped the sceptre of the "Elder Brother," as the Chinese Emperor is called throughout eastern Asia. Other portions of Tibet than Lhasa itself have been visited by some Europeans who did not reach the capital, and all these early missionaries down to and including Father Huc report the most courteous treatment accorded them by the Tibetans, and particularly Father Huc insisted that the Chinese officials, and not the Tibetans, demanded his exile. Why should this be? It chanced that the Chinese delegate to Tibet in 1843 was one Kee Shen, who only three years before had been forced to humiliate himself and his country by signing a treaty forced upon China by the British. Long before the Opium War 1842, the progress of events in India had made the Chinese understand how fearful to them are the results of contact with the people of fire and iron. The contest about the opium trade itself had begun as early as 1790. In addition to that, Tibetan territory had been violated in 1792 by the Gurkhas, who had recently conquered Nepal, subduing the original natives, who are similar to the Tibetans in race, and with affinities in religious

matters. The Chinese believed, that the attack of the Gurkhas must have been countenanced, at least, by the British, since at the time of the attack the British were on friendly terms with these Gurkhas, having recently made a commercial treaty with them; and when a Chinese army, venturing over the dreadful fastnesses of Tibet, had beaten the Gurkha people on Nepal territory and forced them to sue for peace, they found a British officer who had come up at the request of the Gurkhas to aid them in their task of resisting the Chinese. In 1845, also, substantially at the time of the Father Huc episode, Tibet was again attacked from the west through the Ladakh country by the Maharajah of Kashmir, who still holds Ladakh, this Maharajah having been set on his throne by the British after the destruction of the Sikh power in the Punjab. The Maharajah, in other words, was an ally of the British—a protected ally; and it is the peculiar claim of the protecting Powers always that they control the external relations of their wards. Could the Chinese fail to imagine that this also was an attack known to the British as being made against the Tibetans and substantially against themselves? Again, in 1854 the Gurkhas from Nepal renewed the attack upon Tibetan territory; and this time more successfully, because China was again in the toils with the European Powers, being punished by France and England combined for some of her supposed offenses, none of which has ever involved anything but a desire to keep her household as she chooses to keep it. The Tibetans have had time by these experiences and their more complete knowledge of the troubles which China has had to understand as they never understood before the extreme danger of contact with the white man.

A few years ago, in the '80's, Great Britain practically forced upon the Tibetans a treaty for the establishment of a little trading post on Tibetan territory, north of Bhutan. The Bhutanese had for generations been on good terms with the Tibetans, but had been forced to accept a British protectorate, though holding out against the incoming of white men (except the Resident), as, indeed, do the Nepalese. The Bhutanese, the people of the small territory of Sikkim, may be now recognized substantially as the tools of the British Government. Then there came a time when the Dalai Lama varied from his traditional policy of non-intercourse with outside people, only to this fatal but innocent extent,—that is, he sent presents to the Czar through a certain Buriat from the Lake Baikal region in Russia. These Buriats are sheep in the spiritual fold of the Dalai Lama. They have been admitted, together with certain

Kalmucks from the lower Volga, while other outside people, including Asiatics generally, were not admitted, and this by reason of their spiritual relations. This particular Buriat had received, unhappily for Tibet, a European education in a Government Institution, and was therefore much Russified. He desired, very naturally and properly, to enlarge his own career, and by means not now known was able to convince the Dalai Lama that it would be good for himself and his fellow Buriats that their great master in St. Petersburg should be complimented by their spiritual lord in Lhasa. Out of the sending of these presents came the Younghusband expedition. The real matter in question was that Great Britain intended to make it clear that she, and not Russia, should control in Tibet.

As to the future, it is to be considered that if the British supremacy over Tibet is established, it may be followed by the probable taking of Chinese Turkestan by Russia. In the system of balances which the great civilized and nominally Christian nations have adopted among themselves in their dealings with weaker people, it is well understood that the seizure of territory by A shall be followed by some seizure by B, if A and B chance to be rivals in the same field. The ability of the Russians to take Turkestan can in no way be doubted. It has been perceived for the last fifteen or twenty years that it was a happening which might at any time be looked for; and, indeed, the probability of that seizure is, after all, perhaps, Lord Curzon's best excuse for balancing the Central Asian influence; only he has taken time by the forelock and seized Tibet before Russia has seized Turkestan. However that cycle may be completed, suppose Tibet in the hands of England, and Chinese Turkestan in the hands of Russia. We have then a new situation in Central Asia—a new situation in the East generally in this, that these two great jealous rivals find themselves side by side at the back door of China. It is not necessary that either should have a set plan for aggression against Chinese territory in order that such aggression may take place. The same sort of craving for prestige which has urged Great Britain to extend her efforts now even beyond the Himalayas, will continue to urge her onward. Petty disputes become reasons for seizing first this, then that, and the other territory in the border land between China proper and Tibet. Such incidents having taken place there, as they inevitably will hereafter, it may be promptly assumed that Russia will find some cause for complaint along the Mongolian Turkestan border, then on the Mongolian Chinese border, so that we shall have before us the probability of a hidden attack upon the integrity of China at its back door in regions rarely visited

by Europeans, and where much may be accomplished in the way of undermining the prestige of China (so essential to its hold over the interior) without the knowledge of others than the principals,—that is, Russia and England and China.

EARLY WESTERN EXPLORERS AND THE RAILROADS.

BY

HENRY GANNETT.

Between the time of the Lewis and Clark Expedition, near the beginning of last century, and 1870, scores of exploring expeditions traversed the West in all directions. These expeditions were in nearly all cases under the War Department, and were headed by army officers. They made route surveys, by means of traverse lines, mapping by distances and directions the route traversed. A narrow ribbon of country was mapped, which differed in breadth with the character of the country, being broad upon the plains and in the valleys, but narrow in the mountainous regions. These surveys were brought together into a map which was the first to portray, upon any considerable scale and with any pretence to accuracy, the geographical features of the great West.

Among these numerous expeditions a large number were carried out in the late forties and early fifties for the express purpose of discovering feasible routes for railroads connecting the Mississippi Valley with the Pacific coast. These were known as the Pacific Railroad expeditions, and the results were published in a series of quarto volumes.

It has been questioned whether these Pacific Railroad explorations and other Western expeditions suggested the location of the existing railroad systems of the West. To test this matter I have placed upon a modern map of the western part of the country the routes of these expeditions, so that they came in juxtaposition with the existing railroad systems, and have measured on the one hand the mileage of existing roads which follow the routes of exploration and on the other hand those which do not.

It appears that in the Rocky Mountains and Pacific Coast States—that is, those lying west of the eastern boundary of Montana, Wyoming, Colorado and New Mexico—about half the mileage of rail-

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roads follows the routes of explorations. I do not mean by this that the railroads follow these routes in all details, but that the same gaps, passes, etc., are utilized, while in the broad valleys the railroad route may differ several miles from the exploration route, although the line of the valley is followed.

When one considers the great trans-continental lines, however, for whose location these explorations were specifically made, it is seen that the routes of exploration are followed in far greater measure. Thus the Atchison, Topeka, and Santa Fé Railway from the east line of Colorado to San Francisco follows the routes of early explorers for more than six-sevenths of the distance. From the east line of Colorado to La Junta the line follows the Arkansas River in the steps of numerous explorers. From La Junta to Trinidad, Abert and Peck had blazed the way. From Trinidad to Albuquerque the railway follows the route of Capt. Emory, and from Albuquerque to The Needles, on the Colorado River, the route had been explored by Simpson, Whipple, Beale, and Ives. The railroad crosses the Mojave Desert from The Needles to Mohave independently of the route of any explorer, but from Mohave to San Francisco over the Tehachapi Pass and through the San Joaquin Valley it follows Fremont and Williamson.

The Southern Pacific Railway from El Paso to San Francisco follows explorers' routes over about six-sevenths of the distance. The first part is independent of explorers, but in western New Mexico it adopts the route explored by Lieut. Parke and thence to Yuma follows the route of this officer, Capt. Emory, and Lieut. Cooke. It takes up the route of Lieut. Parke at Indio, and follows it by way of Los Angeles and the coast line to San José.

The line of the Southern Pacific Railway from Benicia, Cal., to Portland, Ore., follows almost entirely the route of Williamson and Abbot, the only departure being for a short distance in northern California.

Of the line of the Union and Central Pacific Railroads between the east boundary of Wyoming and Sacramento, Cal., fully five-sixths was pointed out by early explorers. Stansbury traversed this route from the neighbourhood of Cheyenne to Granger, Wy., Beckwith from Evanston to Ogden, through Echo and Weber Cañons. The route down the Humboldt River and over the Sierra Nevada to Sacramento was first pointed out by Fremont.

Of the route of the Denver and Rio Grande Railroad from Denver to Salt Lake very nearly two-thirds was laid out by these early expeditions. Fremont traversed it from Denver to Canyon City,

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and from Buena Vista up the Arkansas through Tennessee Pass and down the Eagle. From Grand Junction to Price, Utah, it was traversed by Gunnison, and from Thistle Junction to Salt Lake by Fremont and Beckwith.

Two-thirds of the route of the Oregon Short Line and Oregon Railroad and Navigation Co., stretching from Granger, Wy., to Portland, Ore., was traversed by these expeditions. Bonneville went over the part between Granger and Soda Springs, Idaho; while Fremont and others traversed the route from Boise to Portland.

Of the route of the Northern Pacific Railroad, from the east boundary of Montana to Tacoma, Washington, three-fourths was mapped by these expeditions. The long stretch from Glendive in eastern Montana to Lake Pend Oreille, Idaho, was traversed by Lewis and Clark, Reynolds, Warren, and Mullen. From the latter point to Pasco the railroad was located on a route not traversed by any explorer, but from Pasco to Tacoma, with one or two trifling breaks, the route was followed by Mullen.

The Great Northern Railway, the latest of these trans-continental lines, discovered its own route for two-thirds of its way, only one-third being suggested by early expeditions. Mullen traversed its route from Williston, on the east boundary of Montana, to Havre and also across the Mission Range, the easternmost of the Rocky Mountains in this latitude.

ANTARCTIC NOMENCLATURE.

BY

EDWIN SWIFT BALCH.

Dr. Hugh Robert Mill recently made a suggestion in the *Geographical Journal* (July, 1905, Vol. XXVI, page 79) which deserves the consideration of other geographers. He says:

> The map of the great peninsula of Antarctic land has been enriched by several new names, but several changes of names are also shown, which we consider ought to be arranged, when necessary, by some international body, such as the International Geographical Congress, because it is very awkward to have different names in different works of reference, and there is at present no authority to turn to when a doubtful point of nomenclature has to be settled.

The need of some fairness and impartiality in connection with Antarctic geography and nomenclature will be apparent to any geographer who turns to pages 17-27 of the July number, also, of the *Geographical Journal* for 1905, and who reads the extraordinary statements and opinions published in the retiring address of the

Ex-President of the Royal Geographical Society, Sir Clements R. Markham.

Sir Clements R. Markham, for many years past, has shown the most uncompromising hostility to American Antarctic explorers, he has repeatedly misrepresented them, and he has so little hesitated in suppressing the truth about them that in articles devoted to Antarctic geography, published a few years since*, he omitted entirely any reference to the governmental United States Exploring Expedition. And yet, to the commander of that expedition, Lieutenant Charles Wilkes, U. S. N., for his services to geography, the Royal Geographical Society itself gave its own gold medal.

In his retiring address, Sir Clements R. Markham has, if anything, surpassed his previous efforts; and as an example of his method of dealing with geographical facts, and also as an example of his feeling towards Americans, the following specimen will suffice. He says (page 21):

> The distant land was named *Adélie* and the ice cliffs *Côte Clarie*. Wilkes appears to have sighted *Adélie* and *Côte Clarie*, previously discovered by Dumont d'Urville, between January 30 and February 7, 1840.

Sir Clements R. Markham knows perfectly well that there is no "appears" about it. "Appears" is a deliberate attempt to cast a slur on the American explorers. Any one who compares the maps of Dumont d'Urville and Wilkes will be instantly convinced not only that Wilkes sighted the same coast as d'Urville, but that he saw a great deal more of it, because, as his track shows, Wilkes hugged the coast east of Adélie Land, whilst d'Urville went or was driven out to sea. Moreover, Wilkes thought he saw high land, which he called Cape Carr, back of the ice cliffs of Côte Clarie, and this fact Sir Clements R. Markham deliberately suppresses.

Sir Clements R. Markham has also now reached a mental stage in which he proposes to re-christen the entire Antarctic region with British names. He says (page 20):

> For convenience in describing the several parts of the vast region, it is divided into four quadrants—
> I. The Victoria Quadrant, 90° E. to 180° E.
> II. The Enderby Quadrant, 90° E. to the meridian of Greenwich.
> III. The Ross Quadrant, 180° to 90° W.
> IV. The Weddell Quadrant, 90° W. to the meridian of Greenwich.

And further (page 26) Sir Clements R. Markham says:

> The Antarctic area would thus consist of two continental land-masses of unequal size, Queen Victoria Land and King Edward VII. Land, separated by this marvellous barrier; and of two seas extending far to the south, the Ross sea and the Weddell sea.

It may be questioned whether, in all the annals of geographical literature, any such astounding assumptions can be found. One

* Encyclopædia Britannica, Ninth Edition: *art.* Geography, and *Geog. Journal*, Vol. XIV, No. 5.

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could readily imagine an Abyssinian dividing the Antarctic into King Theodoros Land and King Menelik Land, and a Zulu dividing it into King Chaka Land and King Mosilikatse Land, but any attempt on the part of an American or of a continental European geographer to introduce such nationally self-glorifying names would certainly and justly be looked on as the whim of an insane person.

To return now to Dr. Mill's pertinent and sensible suggestion, it would seem well that geographers should consider before the next meeting of the International Geographical Congress whether a Committee on South Polar Names should or should not be appointed. If fair and impartial persons were chosen—for instance, Dr. Nordenskjöld for Sweden, Captain de Gerlache for Belgium, Dr. Wichmann for Germany, Dr Mill himself for England, and other geographers of their calibre for their respective countries—it is probable that, if time enough were given to the matter, such a committee might help to clear up Antarctic nomenclature.

Perhaps, however, it would be best simply to let time and future work gradually sift out the proper and correct names. There does not seem to be any desire among the geographers of the mainland of Europe, nor among those of America, to be anything but fair towards the explorers of all nationalities, and in all probability such names as King Oscar Land, the Powell Islands, Cape Carr, and Palmer Land will gradually take their rightful place on Antarctic maps. It seems, perhaps, as if letting things fix themselves might on the whole be wiser than putting the matter into the hands of any body of men, who, at the best, could only arrange in a hurry, and possibly by a series of compromises, the somewhat intricate subject of Antarctic nomenclature.

CULTIVATED RUBBER.

BY

JOHN C. HORTER.*

So peculiarly misinformed is the world at large on the general subject of India-rubber that it would seem that those even curiously inclined, or for any reason interested, have been satisfied with the

*Mr. Horter is the manager of a rubber-planting company in Nicaragua. The BULLETIN has already printed facts concerning the cultivation of rubber in the Malay Peninsula, and Mr. Horter permits the publication here of some extracts from an unpublished paper by him on the same industry in Nicaragua.—(EDITOR.)

impression they early acquired in the pages of "The Swiss Family Robinson" that rubber in strips is obtained from cracks in the bark of trees found in the woods.

Of the status of cultivated rubber the knowledge is even less; but this is more reasonable, since there has been hitherto practically no real information to disseminate; half the world, with an unexplained prejudice, asserting that planted trees yield no product, or at best succumb to repeated tapping, and are a flat failure, while the other half, who have really read extracts from reports which apparently tend to such evidence, vehemently claim that cultivated trees when seven years old, and from then on in an increasing ratio, give from two to six pounds of rubber per year.

A subject which has been so mistreated may be illumined by a statement of the first practical experience in tapping many thousands of cultivated trees, not only once, but twice at intervals of three or four months; and watching the effect of the knife on them. In the belief that the world is interested, the tale told by these trees is here set forth.

That the yield of planted trees is disappointing, at least when compared with expectations, this experience will unfortunately show. But it is not to be inferred that the cultivated tree yields less than the wild tree of the same age. The exaggerated hope for the cultivated tree has grown out of ignorance of the actual age of the wild tree, of which there plainly could be no data. The size of the wild tree as compared with the planted tree gives no hint of its years, for its growth in the shade is much slower than that of the sun-grown cultivated tree.

In the district under consideration, which is thirty miles from Bluefields and near Pearl Lagoon, the oldest rubber plantation was planted with seed of the "Castilloa Elastica" species in 1897. On this plantation in May, 1904, were tapped 6,000 trees, and an average of one and one-third ounces of dry rubber was obtained from each tree. The total product was shipped from Bluefields in June, 1904. The product of the second tapping of the same trees left Bluefields on Dec. 14.

These are the only considerable shipments from cultivated trees from Nicaragua, and, if there has been any wholesale tapping elsewhere, or anything more than in an experimental way, the fact has not been made public.

The neighbours were aghast at the small showing, and ascribed it either to the wrong season of the year, or to an inadequate number of incisions, or to the instruments employed. After waiting for

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months, in order to note the effect of the first tapping on the trees, and finding none in any way impaired, the second bleeding was commenced. The same 6,000 were cut, and a few thousand more, resulting in an average yield from each of one and eleventh-sixteenths ounces.

Intrinsically, the quality of cultivated rubber is precisely the same as that taken from wild trees, since both are of the species "Castilloa Elastica," which is found in the forests of all the Central American countries. Commercially, however, the product of the planted tree is likely always to be more valuable because of the greater care in gathering it. In the forest a tree of the size of those tapped on the plantation is much older, and therefore gives much more milk. This milk is not only permitted to find its way to the base, but is guided there, where it mingles with the dirt and spreads itself into a cake, or what is called *cuero* or *tortilla.* No effort is made to keep it clean; on the contrary, the added weight of the adhering dirt is aimed at. If the expectation of the yield is disappointing, it is in a measure a compensation to know of the vitality of the planted and cared-for *Castilloa Elastica.*

During the first tapping an incompetent chopper entirely girdled twenty-three rubber trees before he was discovered and stopped. They healed the same as the remainder, and were bled along with them at the second milking, giving the same quantity of rubber as the other trees.

As long as the sap is not cut into or girdled, the outside layers of the bark of the rubber tree may be cut clean around, or, in fact, removed from any considerable space with impunity. We have, in fact, seen as much as two feet peeled off. The bark alone contains the milk—the product—and in no way affects the life of the tree.

The majority of planted trees are cultivated in the sun, and the great tenacity of life which they show is owing to the influence of sunlight, which helps the tree to resist the encroachment of disease or any attack on it. Hence the incisions made with the knife on the planted tree heal very much more rapidly than on the wild tree, which is always in the deep shade.

The wild tree when tapped is ascended by means of the same spur that is used by the telegraph-pole climber. These spurs penetrate the bark. In the holes thus made is deposited a worm, which eats through the trees and causes its destruction. It also attacks the planted tree; but, as already explained, the influence of the sun which the wild tree lacks soon nullifies its work .

There are very few, if any, large trees remaining in the forest,

and one that gives as much as five or six pounds of dry rubber at a tapping is a rarity. Stories of 100 pounds to a tree are still told by old gatherers, but there are no means of confirming such stories now. The native never keeps a record of anything, and can seldom give the date of his own birth, or of any other event. The opinion, then, of these people, if asked as to what a certain tree will yield, is of no value, but it is probably responsible for the exaggerated hopes that have been entertained by the outside world.

Some of the earlier plantings here were from seed sown in nurseries and, after about a year, transplanted to the land cleared and prepared for them. More recent plantings, however, are from the seed, about five being put in a hill, where the fittest only is allowed to survive. Most of the plantations have their trees ten feet apart, some no more than seven; our own are fifteen. The open sunlight has been given in almost every instance after the trees were removed from the nurseries until they were three years old.

Why there should be any unreasoning disbelief in the successful cultivation of rubber it is difficult to understand; for was there ever yet a tree, bush, or vine growing spontaneously in the earth that was not bettered by man's care and cultivation? In Nicaragua, where the wild rubber tree is called "God's tree," it does not seem unreasonable to expect it to grow, to flourish, and to yield. If disappointment now seems to attend these efforts and the reward appears inadequate, it may only be because hope was set too high; and had expenditures been originally made with more reasonable expectation, the results as they are now disclosed would not present a wholly discouraging view.

A word about stock companies formed to plant rubber. United States Consuls at many stations, on hearsay evidence only, and with out any knowledge whatever of their own, were responsible, when these companies were formed, for the exaggerated hopes of many investors.

It was very reasonable on the part of the originators of these companies to promise a return which their own investigations had led them honestly to expect; and, if the results only just now disclose error, it by no means follows that there was originally any intention to deceive. It was and is a mistake for a poor man to invest in planting rubber, the returns from which cannot be looked for short of several years. Investors were invited into these companies on some sort of a monthly instalment plan, and, growing tired (just as that class of investors usually do) and defaulting on their promises, probably caused the failure of the companies for want of funds.

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The rich man alone can afford to plant rubber. Certainly, some one must do it, and at once, if the world is to be supplied. With the full yield from every tree now in cultivation, there will not be enough from such a source, with the wild tree out, to supply one large city. For the rich man who wants a safe investment paying a fair rate of interest there could be no better opportunity than to plant rubber.

This incontrovertible fact stands out; it costs $1 (and in many cases much more) to bring the cultivated tree to its seventh year. The tree then gives but four and one-sixteenth ounces of rubber; after deducting the cost of gathering the rubber and caring for the plantation and after the seven years of waiting the return only then begins to be 6 per cent. on the investment.

THE PARTITION OF SAKHALIN.

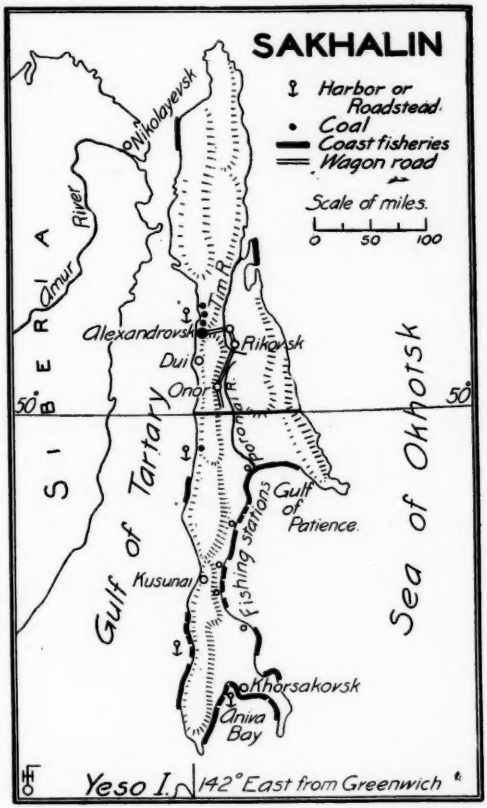
One of the results of the Treaty of Peace between Japan and Russia was the partition of Sakhalin, so that the southern part of the island has come into the possession of Japan. Our map shows the boundary between the Japanese and Russian territories. It is a line coinciding with the Fiftieth parallel of north latitude. As the northern or Russian part of Sakhalin is wider than the southern part, Russia retains more than one-half of the area, and, as far as is yet known, the larger area of coal fields, which thus far appear to be the most important source of mineral wealth.

Japan's territory, on the other hand, being farther south, is somewhat superior in climatic conditions, and therefore in agricultural prospects. There is little opportunity, however, for very important farming development, as the growing season is too short, even in the south, to mature cereals, though large quantities of other vegetable food may be raised.

The great attraction of the island for the Japanese was the fishing-banks along parts of the coasts, which are rich in fish food, and may be developed into fisheries of very large importance. Our map shows the portions of the coast-line where these fisheries are of most value; and it will be observed that the most extensive of the fishing-grounds have come into possession of the Japanese. Another source of wealth by which the Japanese will profit is the fur animals, and especially the sable. As yet the forests of Sakhalin have been little hunted for them, though the leading fur animals of Siberia

abound there. Before the treaty of peace was signed the Japanese, between July 7 and 12 last, landed troops in sufficient number to take effective possession of the entire southern coast.

In the northwest part of the map is Nicolaievsk, in Siberia, which promises some day to be of considerable importance as the seaport of the Amur River.



Sakhalin lies off the east coast of Siberia between latitudes 45° 54′ and 54° 24′ N. Lat., and is separated from the mainland by the Gulf and Strait of Tartary, the latter being very narrow at about latitude 52° and full of sand banks. It is about 600 miles long and from 16 to 100 miles wide. A mountainous ridge runs along the island for the whole of its length, flanked by low sandstone hills to the east and west but of greater extent on the east. There are two principal rivers, both reaching the sea on the east: the Tim, flowing northward into Nyi Bay to the Okhotsk Sea, and the Poronai, flowing southward into Patience Gulf towards the Pacific.

Mr. L. V. Dalton, who has recently visited the island, writes to the *Asiatic Quarterly Review* that, contrary to the general view, much of the summer weather is the finest that could be wished for,

while the winters, though cold, are dry and healthful, like those of Canada. Three-fourths of the island is covered with dense pine forests. In the north are also the larch and birch, while in the south are the maple, oak, ash, bamboo, corktree, and other sub-tropical trees or shrubs. The fauna includes the bear, fox, sable, wolves, reindeer, and the small striped squirrel of northern India, while in the rivers or along parts of the coast seal, salmon, and more southern fish abound. The spouting of Greenland whales is no uncommon sight on the coast washed by the Okhotsk Sea.

The total number of inhabitants is about 36,000, of whom only 4,000 are natives. Nearly all the present white population consists of convicts and Russian officials and soldiers. The Russians are for the most part confined to two districts—one around Alexandrovsk on the west coast, and the other around Khorsakovsk on Aniva Bay in the extreme south of the island. A few settlements are scattered up and down outside these areas, but the principal prisons are at Alexandrovsk and Khorsakovsk, with a large sub-prison at Rikovsk east of Alexandrovsk.

The native population is composed of about 2,000 Gilyaks, 1,300 Ainus, 750 Orotchons, and 200 Tungus. Scanty though the population is for the size of the island, Sakhalin has no lack of resources, vegetable, animal, and mineral. The coal of the Dui-Alexandrovsk mines has been worked for many years, and gold and other metals occur at many points, though an obstacle in the way of mining is the fact that in the northern forests the soil is frozen below a depth of four feet the year around.

Mr. Dalton expresses the view that the annexation of the southern part of the island by Japan will materially benefit the country, as it means that the convict settlement there will be abolished; and as the convicts have had no interest in promoting the development of the island's resources, Sakhalin has not been helped by their presence.

UNIFORMITY IN MOUNTAIN ELEVATIONS.

BY

PROF. ANGELO HEILPRIN.

In a paper entitled "The Accordance of Summit Levels among Alpine Mountains," and published in the *Journal of Geology* for February-March, 1905, Mr. Reginald A. Daly presents some interesting considerations bearing upon one of the most obscure of geo-

graphical problems, and much side-light (or thought) upon the theory of peneplanation as it is brought in to explain the phenomena which he discusses. It cannot, perhaps, be said that Mr. Daly fully responds to or satisfactorily meets all the problems which he himself propounds, but that he successfully sets to side a theory or doctrine in geology which has become more than popular with the "newer school" of physiographers many will agree.

The facts to which the author refers have long been known to students of mountain-forms, and, perhaps, equally so to the mountaineer, who sees in Nature naught but "the beauties of Nature," and in whose broader contemplation theoretical conceptions have no part. The problem as to why the dominant summits in a given mountain chain or system are so nearly of a uniform height manifestly attaches itself directly to the theory of peneplanation, since it reflects, although in a less trenchant way, the problem of even crest-lines, such as is typified in the long N. E.-S. W. extent of the Appalachian system of mountains. In other words, the lofty mountain summits are residual masses standing out from an eroded and formerly even-topped (or peneplanated) land-surface, and their tip-tops point in a general way to the upper horizon from which they have been cut.

Mr. Daly, in weighing the evidence, finds that the conditions of peneplanation do not satisfy the problem. An important consideration with him in arriving at the conclusion is the necessity for assuming that the condition of peneplanation must have been followed precedent to the new erosion by a warping (with medial upthrust) of the land's surface, so as to bring about that "low arch, highest in the interior of the range and elongated in the direction of the main structural axis of the range" which is thought to mark the "imaginary surface which will include the higher summits of peaks and ridges in an Alpine range."

But one may well pause here and ask: Has the imaginary surface which unites the culminating points of an Alpine chain really this form of an arch? Were the Alps, or the Pyrenees, or the Caucasus alone considered one might be tempted to answer in the affirmative; but when the broader prospect of the nearly 1,500 miles' extent of the Rocky Mountains, between Mount Columbia and the Sierra Blanca, with its hundreds of summits rising to the 12,000-14,000 foot level, is opened up; or the equally long line of the Himalaya-Karakorum system—with its loftiest elevation, Mount Everest (29,002 feet), far toward its eastern part separated by a thousand miles or more from its "second in line," Mount Godwin-Austen (or

Peak K[2], 28,278 feet)—be considered; or the still more formidable chain or cordilleras of the Andes, with summits rising from 19,000 to 22,000 feet distributed irregularly over a course of 3,000 miles or more, it is only with a feeling that the imagination has been geographically stretched that we can consider the theoretical arch to exist. In so far, therefore, an objection to the theory of peneplanation—to the extent, at least, that it necessitates the condition of warping—might be considered removed. Probably a far more serious objection to the theory in this connection is the condition itself that residual fragments of a peneplanated surface should remain of so nearly uniform elevation of whatever physical type the constructing form may be, after erosion had removed (or lowered) the general surface by many thousand feet. The student of geological physics who has not yet been completely won over to the doctrine of peneplanation may, indeed, ask for much stronger evidence than has yet been presented proving the kind and measure of land-wear that is demanded by this theory before he will be willing to relinquish the consideration of other explanations that seem to meet his problems equally well, and he will, perhaps, hardly be on the outside of the science if he still entertains a suspicion that even the lower eroded surface representing the even crest-lines of the Appalachian Mountains need not necessarily be the expression of peneplanation.

Without entering into a further discussion of this theory and of its consequent conditions, or following too closely the speculative views of Mr. Daly, it is interesting to note that our author finds a safer ground in the analysis of his problem in assuming that his isometric summits are such largely (or mainly?) by inheritance (from an "original" top-line of development), or, more exactly, inheritance modified by isostatic adjustments and differential degradation.

In assuming this hypothesis, Mr. Daly relies, perhaps too much, upon the theory (set forth by himself) that a constructional limit to the height of a mountain can be predicated, and that this ultimate height is determined by the resistance of the mass to a crushing strain. In other words, Nature, in making mountains, permits them to rise to a certain elevation and no more, and this farthest elevation will be the even measure whence the departure from inheritance must be calculated. But have we any evidence in fact to support this conclusion? Mr. Daly believes that no mountain is likely to have ever risen to a much greater height than 30,000 feet or to have greatly overtopped Mount Everest. It may be admitted at once that there is no evidence of any kind to support this conclusion,

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unless, indeed, one assumes the wholly illogical position that *because* the loftiest summit to-day rises to 29,000 feet it necessarily represents the limits of work in this direction. It might as well have been argued in 1750 that this limit of resistance to crushing strain was the Peak of Teneriffe (then thought to be the highest mountain in the world) and, a quarter of a century later, the Mont Blanc; and still later Chimborazo.

While Mr. Daly's paper deals exclusively with isometry among Alpine summits, and the discussion there given is seemingly made to contour the full problem which it attaches, the fact is that the problem is made much more complex by reason of the condition that accordance in summit elevation (or isometry) is as much a distinctive feature of low mountain chains as of high ones, and in those of antiquity as of new age. One need hardly call to mind (without reference to any theory regarding such formation) the familiar Azoic and, later, Paleozoic stems of the Appalachian system; the 1,500-mile length of Permo-Carboniferous Ural Mountains, with culminating points in the north and in the south of 5,200-5,500 feet; the Jurassic Jura Mountains, and the great Cretaceo-Tertiary involuted Carpathian-Balkan uplift, with its numerous summits of 7,800-8,600 feet elevation scattered over a length of 1,200 miles or more. Other examples of similarly-adjusted mountains could be cited, and a conspicuous reference would be the east-coast mountains of Australia or the Great Dividing Range, with its various ramifications and parallel spurs, in the farther southwest. A most interesting element in the problem under consideration, and one that opens up entirely new vistas in speculation, is the condition that even among *volcanic* mountains of comparatively recent date and where the volcanic form is still retained, there is frequently a marked correspondence in summit-levels for given series. It would be entirely beyond the bounds of this paper to enter into a discussion of this most interesting disposition of Nature's forces, but it may not be amiss to call attention to that remarkable linear group which constitutes the major part of the Lesser Antilles, and gives to the different islands (St. Kitts, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, etc.), stretched out over a length of 600-700 miles or more, the extraordinarily accordant summits of 3,500-4,200 feet elevation.

The problem of mountain reliefs and adjustments does not seem to the writer to lend itself so readily to approach and resolution as many other problems in geology, and a caution for facts in advance of theories could hardly be thought to retard the study of this most fascinating department of terrestrial physics.

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MAP OF THE UNITED STATES ON A SCALE OF 1:1,000,000.

The United States Geological Survey has already made large progress under the direction of Mr. Henry Gannett, Geographer of the Survey, in the production of a map of this country on a scale of 1:1,000,000 or 15.8 statute miles to an inch, in accordance with the recommendation of the Eighth International Geographic Congress. This recommendation was as follows:

> The Congress proposes to the Government of the United States the execution of a general map of America on the scale of 1:1,000,000, similar to maps on the same scale of parts of Asia, China, and Africa now in preparation by the Service géographique de l'Armée in Paris, by the Königlich-Preussische Landesaufnahme in Berlin, and by the Intelligence Division of the War Office in London; each sheet of the map being projected separately and being limited by parallels 4° apart and meridians 6° apart; the initial meridian being that of Greenwich, the initial parallel the equator; the standard of measures being the meter.

The information supplied to the Society by Mr. Gannett enables us to show on this map the parts of the country for which maps have thus far been drawn on this scale. The areas thus covered are in black. They embrace the whole of Virginia, West Virginia, Maryland, Delaware, the Indian Territory, Oklahoma, Kansas, Nebraska, New Mexico, Arizona, Colorado, Wyoming, Utah, the western half of South Dakota, and parts of California. The map has been drawn for all these regions and is ready to be engraved.

The sheets for the eastern part of the United States are in progress. A map showing the drainage of this part of the country is being made for Mr. Newell, Chief Hydrographer of the Geological Survey and Chief Engineer of the Reclamation Service. It is being prepared on a scale of 1:1,000,000. Contours of elevations will be placed on these sheets, which will thus be adapted to form a part of the map of the country on this scale.

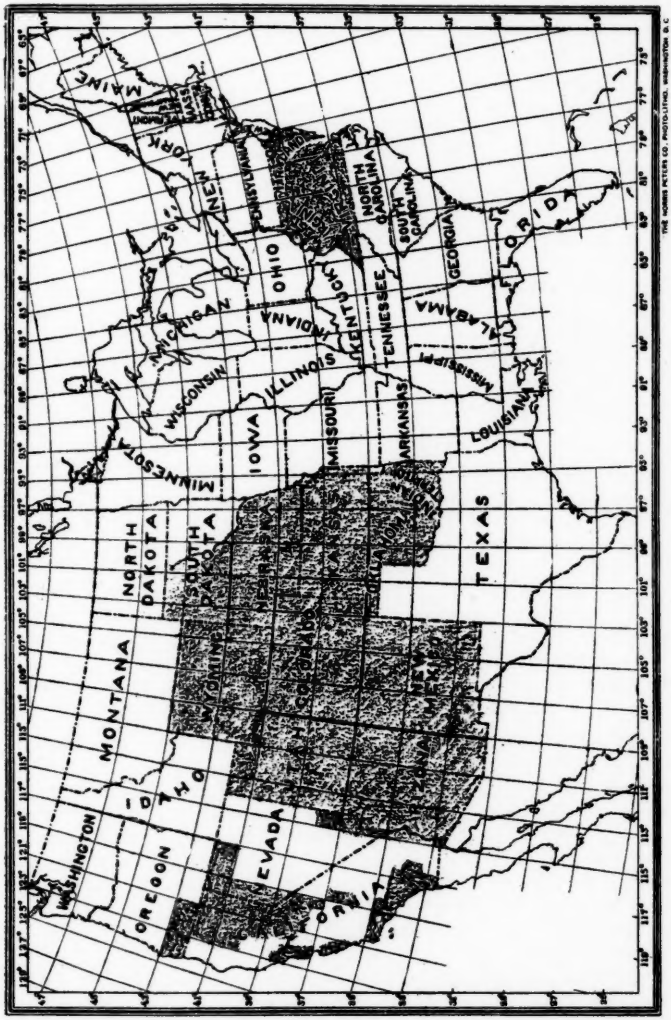
Mr. James White, Geographer of the Canadian Department of the Interior, has charge of the work of producing a map of Canada on the desired scale.

Our Geological Survey has taken steps to interest the countries of South America in this work and induce them to undertake on their own account the preparation of maps of their respective domains on the uniform scale.

Our army service in the Philippines will contribute a map of the archipelago to this general map of the world. The next map to be made of the Philippines will be on the scale of 1:1,000,000.

All this work is in accordance with the plan presented to the

Geographical Congress at Bern in 1899, by Dr. Penck, for a map of the world on this scale, the sheets to be limited preferably by meri-



dians and parallels. Up to the close of last year only three nations had prepared map sheets in accordance with this plan. France made the first step. The Geographical Service of the French Army

issued a series of maps of the Antilles, Persia and China on this scale. The cartographic department of the Royal Prussian Land Survey followed with a map of eastern China, a number of sheets of which are now completed; and the Intelligence Division of the War Office of London is now publishing a large map of Africa on the uniform scale. All these enterprises are helping to carry out the scheme of a uniform map of the world the progress of which will be advanced to an important extent by cooperation in the western hemisphere.

A LETTER FROM PROFESSOR W. DEECKE.

SIR,—With reference to the review of my book on Italy* in No. 10 of Vol. XXXVII of the BULLETIN, permit me to state that the book has been translated without my knowledge and consent, and that I must therefore decline all responsibility for the alteration or omissions or any other liberties the translator may have taken with the text of the original.

Greifswald, October 21, 1905.

W. DEECKE, Ph.D.,
Professor in the University of Greifswald.

To the Editor of the BULLETIN.

GEOGRAPHICAL RECORD.

AFRICA.

THE BRITISH ASSOCIATION IN SOUTH AFRICA.—Professor W. M. Davis, of Harvard University, has lately contributed to the New York *Nation* and to the *Boston Transcript* five letters giving a general account of the recent visit of the British Association to South Africa. The two letters in the *Nation* give a more formal account of the meetings and of the itinerary of the various excursions; the three letters in the *Transcript* describe the more personal events of the voyage to Cape Town, of the journey into the interior as far as the Victoria Falls of the Zambezi, and of the voyage home from Beira by the East Coast. Some four hundred over-sea members, including sixteen foreign guests, of whom five were from the United States, took part in this great excursion. The plans were so carefully laid that every arrival and every departure occurred on dates that were

* Italy. A Popular Account of the Country, its People and its Institutions (including Malta and Sardinia). By Professor W. Deecke. With numerous Maps and Illustrations. Translated by H. A. Nesbitt, M.A. London: Swan Sonnenschein & Co., Ltd. New York: The Macmillan Co., 1904.

planned before the party left England—except that there was an unexpected delay for those who came back by the East Coast steamer, on account of the obstruction of the Suez Canal by the explosion of the steamer *Chatham*.

Prof. Davis's references to his personal experiences indicate that he accompanied several geological excursions; the first led by Rogers, Geologist of Cape Colony, in the Karroo, where the east and west ranges and valleys stand in the same relation to the plateau of the Veld that the Appalachian ridges and valleys of Pennsylvania and Virginia bear to the Allegheny plateau; the second excursion in Natal, led by Anderson, Geologist of Natal, in association with Molengraaff, formerly Geologist to the South African Republic; the third in company with Hatch, President of the Geological Society of South Africa, to Vereeniging on the Vaal River, and the fourth to the northeastern part of the Transvaal, led by Hall of the Geological Survey of that colony.

The visit to Victoria Falls, the farthest point inland, was made by the entire party in three special trains, and was greatly enjoyed by every one. We note that Prof. Davis spoke at the recent meeting of the National Academy in New Haven on the Dwyka glacial formation of South Africa, and that he is to address the Boston Society of Natural History early in December on Geological and Physiographical Observations in South Africa. We are glad to announce that Prof. Davis will address the American Geographical Society at Mendelssohn Hall on Feb. 20 next, the title of his lecture being "With the British Association in South Africa."

AMERICA.

THE ASSOCIATION OF AMERICAN GEOGRAPHERS.—This Association will meet at the house of the American Geographical Society on Tuesday and Wednesday, Dec. 26 and 27, holding morning and afternoon sessions. The Association was organized in Philadelphia in December last year, and its membership is limited to persons who have done original work in some branch of geography. The programme will include the reading of papers by members, some of which will be illustrated by lantern-slides. The BULLETIN is requested to announce that the Association extends a cordial invitation to members of the American Geographical Society to be present at its meetings.

PROGRESS OF THE ALASKA BOUNDARY SURVEY.—Superintendent Tittmann of the U. S. Coast and Geodetic Survey informed the Society on Nov. 10 that at that time the Alaska boundary surveyors were either leaving or had left their fields of work owing to the inclemency of the weather. The season during which the demarcation surveys of the Southeastern Alaskan boundary can be carried on lasts for about five months, or from June to October. The heavy snows do not disappear from the lower slopes of the mountains until June, and when they begin to melt, the surveyors contend against the torrential floods in the narrow mountain gorges through which the melting snows and glaciers discharge. Aside from the great physical difficulty of transportation and the inaccessibility of the mountains, the rains and clouds which hide the mountain peaks interfere with the operations during the greater part of the short season in which the work can be carried on.

Mr. Tittmann added that during the field season just closed the surveying and demarcation parties were distributed as follows:

A Canadian party marked the crossing of the line on the Salmon River which

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flows into the Chilkat, and an American party continued last season's work on the main Chilkat River, the crossing of Glave Creek having been monumented in a previous season;

Another American party marked White Pass and the crossing of the upper valley of the Skagway and determined the geographical positions of several peaks with reference to the coastwise triangulation with which the boundary peaks are to be connected;

A Canadian party marked the line from the first peak south of the Stikine River to Mount Whipple and was engaged in the triangulation beyond;

An American party carried the necessary triangulation up the Unuk River, marked the crossing of the line below the cañon and determined the boundary peaks to the east and west of the river;

A Canadian party operated at the head of the Portland Canal, working westward from the monument established by the American and Canadian Commissioners during the previous season.

THE HEIGHT OF MOUNT WHITNEY.—Mr. Henry Gannett informs us that the U. S. Geological Survey last summer ran a line of levels from the Pacific Coast by way of Los Angeles and Mohave and Owens Lake Valley to the summit of Mount Whitney, giving it a height of 14,499 feet. This entire line was double-rodded, and is doubtless accurate to within a foot. This appears to settle the much-disputed question of the height of this peak. It slightly exceeds in height any other mountain in the United States, outside of Alaska. Mount Rainier, in the State of Washington, was determined by 13 vertical angles to be 14,363 feet high; so that Mount Whitney surpasses it by more than 100 feet. It is also higher than the loftiest summit in Colorado. The determination of Mount Shasta by means of many vertical angles gives it a height of 14,380 feet.

UNDERGROUND WATERS OF LOUISIANA.—*Bulletin* No. 1 (1905) of the Louisiana Geological Survey gives information now available concerning the underground waters of the State. The serious study of this question began in 1899-1900, and it is now possible, by consulting maps based upon these investigations, to make a very fair estimate of the underground water prospects of any district. The well sections published in this report show about what may be expected concerning the nature and thickness of the various strata penetrated before water is reached. Mr. Veatch, working conjointly for the United States and the Louisiana Surveys, has compiled a long catalogue of localities with true heights above mean Gulf level. This is of great use for the investigation of underground waters. A list of these altitudes filling 55 pp. is published as an appendix.

TERRESTRIAL MAGNETISM IN LOUISIANA.—*Bulletin* No. 2 (1905) of the Louisiana Geological Survey shows what has been accomplished in the establishment of meridian lines for the use of surveyors and what measurements have been made to ascertain the changes in the earth's magnetic field within the State. Louisiana is the third State in the Union to have a satisfactory magnetic survey including all three elements—declination, dip, and intensity. Before the magnetic work had far advanced various reports dealing with this branch of geophysics in Louisiana indicated that East declination was decreasing at the rate of 3′ per annum. The later work has proved that former calculations were incorrect, and that since about 1898 East declination has been increasing at least 1′ annually. Every surveyor in the State now has a ready means of finding what the index

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error of his compass is. The pamphlet contains an isogonic chart of the world and an isomagnetic chart of Louisiana.

TIDE GAUGE WORK IN LOUISIANA.—The Louisiana Geological Survey announces (*Bulletin* No. 3, 1905) that it is beginning the work of precise levelling in the southern part of the State. One purpose is to supply bench marks for local surveys, especially for canal and railroad enterprises. All local lines may then be referred to one datum plane, and the time saved by local surveyors in running and correcting level lines will be important. Another advantage will be the determination, in the course of time, of the direction and rate of vertical movement of the earth's surface in this region.

ORIGIN OF THE CHANNELS SURROUNDING MANHATTAN ISLAND, NEW YORK.—Under this title Prof. Hobbs (*Bull. Geol. Soc. Amer.*, Vol. 16, 1905, pp. 151-182) presents a great mass of facts and considers their bearing upon the problem of the origin of the valleys in and around New York City. By reference to previous literature he shows that it is the prevailing opinion that these channels, which give to New York its peculiarly favourable water frontage, are due to the influence of weaker rock strata, notably limestones, which, by weathering and stream erosion when the land stood at a higher level, gave rise to valleys now occupied by ocean water because of depression of the land. He then presents a great deal of evidence, obtained by painstaking gathering and study of records from borings and excavations, showing that, in fact, there is little correspondence between the directions of the limestone belts and the water front. For much of its distance Harlem River crosses limestone and gneiss in a direction transverse to the strike of the rocks; the numerous excavations beneath bridge piers and in tunnels in East River show hard rock, and not limestone, as the prevailing rock; and the North River extends along the contact of two series of rocks, the Newark traps and the older crystallines of Manhattan Island. From the observations which he has made Hobbs concludes that the water front of New York City owes its form, not to normal stream erosion, but to the guidance of lines of fracture. R. S. T.

ORIGIN OF THE WEST INDIAN ARCHIPELAGO.—No living geologist has studied the West Indies as extensively as Prof. R. T. Hill, and whatever he may write upon this subject is worthy of the closest attention. In a recent paper (*Bull. Amer. Geol. Soc.*, Vol. 16, 1905, pp. 243-288) he takes a strong stand against the views set forth, especially by Spencer, that this archipelago represents the remnants of a lost "Antillean continent" and that the channelways among them are drowned river cañons. Hill divides the archipelago into four groups on the basis of origin—(1) the Bahamas, submerged banks of unknown origin now covered by wind-blown coralline sands; (2) the Great Antilles, true mountain-folds accompanied by old igneous intrusions; (3) the South American Islands (Trinidad, etc.), which are disconnected outliers of the South American continent, analogous to Long Island; (4) the Windward Islands, which are ocean-born volcanoes, built up by frequently-repeated eruptions similar to those recently observed in Martinique.

Prof. Hill's paper contains a great deal of fact relating to the physical geography and geology of the archipelago, and particularly of the Windward Islands. The highest land altitude in the Windward Islands is 5,000 feet, and the greatest sea depth 17,064 feet, giving a total relief of over 22,000 feet from the sea-floor, 29 per cent. of which is above sea-level, 71 per cent. below. With

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the exception of Barbados these islands are composed of volcanic ejecta supplemented by deposits of limestone derived from marine organisms which lived along the shores and were later added to the land by uplift. There are no granite or ancient sedimentary strata and no transported drifts or gravels indicating former continental relations. The history of the Windward Islands involves "volcanic eruption, marine planation, secular upheaval, and lime-making oceanic life" is the conclusion which Prof. Hill has reached from his studies of the region; and it may be added that most physical geographers will probably agree to this conclusion. R. S. T.

Baron Erland Nordenskjöld's Work in Northern Bolivia.—Reuter's Agency has received from this explorer some details of his study of Indian tribes during the past eighteen months in northwestern Bolivia. With three comrades he left England in January, 1904, crossed the Andes to La Paz, and then made his way into the forests to the north. He visited three tribes—the Yamiacas, Guarayos, and Atsapuacas—who until recently lived in the pure "stone age." No white man had previously visited the last-named tribe, though they were using some implements made by whites that had reached them through other tribes. The explorers were very well received by the natives, but were unable to get into contact with a fourth tribe whose territory was crossed, as the people would have nothing to do with the visitors, though closely watching them from a distance. Baron Nordenskjöld says that the Quichuas and Aymaras living around Lake Titicaca are a very interesting study, as they have retained many customs unaltered since the time of the Incas. The explorers suffered much from illness, which forced them to abandon their researches earlier than they had intended.

Progress on the Guayaquil and Quito Railroad.—The British Consul at Guayaquil reports that during the year ending last August the Guayaquil and Quito Railroad was pushed forward, and is now running three trains a week to the important and populous town of Riobamba. The line is now levelled for a considerable distance beyond that town, and it is expected that Ambato will soon be reached. An American capitalist is establishing a system of automobiles, which are expected to make the journey from Riobamba to Quito within twelve hours, thus reducing the time occupied between Guayaquil and Quito to two days.

ASIA.

Seaweed Industries of Japan.—In this Bulletin for November, 1904, the writer called attention to an interesting comparison of American and Japanese fisheries. Recently there has been issued, first, as a part of the *Bulletin* of the Bureau of Fisheries, 1904, Vol. XXIV, pp. 133-181, and, second, as a separate "extracted" from the above, a rich body of material relating especially to the seaweed fisheries and dependent industries of Japan. Hugh M. Smith is the author. The value of seaweeds prepared in Japan exceeds $2,000,000 annually, and this excludes large quantities which never enter commerce, but are used where prepared by the families of the fishermen. This magnificent output is due (1) to the great extent of the coast-line, bringing a large proportion of the people near the sea, (2) to multitudes of harbours large and small, (3) to the abundance and variety of useful algæ, which flourish in their marginal waters, (4) to the ingenuity of the people, developed under long experience and adjustment, in putting the various kinds of plants to the best use, in utilizing them to the fullest extent, and in devising methods of collecting and preparing them.

The industry has grown along four lines—*kanten* or isinglass, *funori* or glue, *kombu* or food preparations, and the extraction of iodine. In the first division, the industry consists of gathering the algæ in the shallow waters of the sea, drying them on shore in the sun, transporting them to the hills, where their preparation is best carried on, and then cleaning and boiling, straining, etc., to reduce the material to a thick pulp when hot. It cools in moulds into sticks or bars of hardened jelly ready for market, where it is sold to be used at home for food, soups, sauces, etc., and abroad for jellies, desserts, sizing of textiles, clarifying liquors, and in making moulds for plaster-of-paris works. The product is the agar-agar of the bacteriological laboratory.

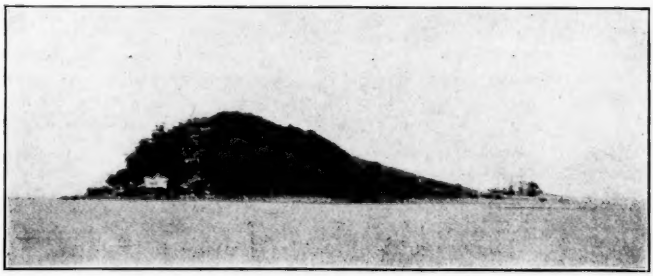
In the second, seaweed glue is prepared by simple processes wrought on the cleaned and dried sea algæ. The glue is used for glazing and stiffening fabrics, also as is laundry starch. Japanese women sometimes clean their hair therewith.

Kombu is a general name given to a variety of seaweed foods. Dried kelp is rolled into bundles, cleaned, boiled, and strained; and then the product shredded and put up into boxes for market. Kombu in one or more of its various forms is a part of the food of almost every Japanese family, often a standard article. Judging from its chemical composition it is valuable and nutritious. It contains from 4% to 6% of protein, 1% of fat, and 30% to 50% soluble non-nitrogenous matter.

The fourth product is iodine, which is derived from many species of seaweed, by burning the dried plants and washing the ashes and then concentrating the brine until all the salts are dry. The residue goes into a retort with sulphuric acid and the iodine is distilled off. The details of all these processes, besides several others, are given in the paper and well illustrated. G. D. H.

AUSTRALIA.

An Island of Iron in Queensland.—The Northumberland Islands belong to Queensland and lie off the east central coast in the Pacific, between the towns of Rockhampton and Mackay. One of the smallest islands in the Duke Group of this archipelago is Iron Island, of which a view, taken from Publication No. 194 of the Geological Survey of Queensland, is here given. The whole island is iron



IRON ISLAND IN THE PACIFIC.

ore except a strip from 60 to 120 feet wide on the west and a sand flat across its northern end. The island is 1,320 feet in length and 528 feet in greatest width, its highest point being 120 feet above high-water mark.

It is estimated by the Geological Survey that the amount of ore above high-water mark is 1,500,000 tons and that the additional ore available between high and low tide (23 feet) amounts to 750,000 tons, making a total of 2,250,000 tons of available ore. The rock on the western side of the island is greenish, highly-altered trachyte in which there has been great development of east and west cross quartz veins, probably formed before the iron was introduced into the surrounding region. On the south side of the island are three outcrops of pure white statuary marble from 10 to 20 feet across and 20 to 60 feet in length.

It is believed by some Queensland geologists that the ore metasomatically replaced limestone and slate and that the formation of ore may still be going on, inasmuch as the ridge top supports figs and scrub vegetation, showing that spring water is still reaching the surface. The ore consists chiefly of cryptocrystalline magnetite with massive hematite, and has scarcely a trace of impurity. Its specific gravity is 4.5 to 4.6. Blocks of ore up to 10 feet in diameter are piled up around the base of the island. No work has yet been done, but there will be no difficulty in mining down to tide-level; to work below that level a wall of ore will have to be left to prevent the entrance of the sea-water.

EUROPE.

SOURCE OF ELECTRIC POWER IN BAVARIA.—Major von Donat, the author of the well-known plan for the drainage and colonization of the Pontine Marshes, has placed before the Bavarian Government a project for creating a source of electric power sufficient to run all the railways of the country. He would secure this power by damming the River Isar between Wallgau and Vorderritz, thus creating a new lake, and connecting this with the Walchensee and the Kolchelsee. He has figured out that this would effect a saving of $10,000,000 a year.

THE GLACIERS OF THE WESTERN CAUCASUS.—The Imperial Russian Geographical Society has published a report by Mr. N. A. Bush (Memoirs, Vol. XXXII, No. 4) on "The Glaciers of the Western Caucasus." Mr. Bush was sent by the Society in 1896, 1897, and 1899 to the Kuban Territory and the Suchum district (both north and south of the Western Caucasus) to study the glaciers and flora. The volume deals with the results of the glacial investigations. It describes nearly all the glaciers in the Kuban Territory and probably most of those in the Suchum district. The number of known glaciers on the northern slope of the Western Caucasus is 230, of which Mr. Bush explored 224. The number of glaciers on the southern slope is unknown, but 54 were explored by Mr. Bush.

All the glaciers of the Western Caucasus are receding, this process having begun no less than 25 years ago. The retreat of glaciers of the first class has of late been very pronounced, but irregular; one glacier receded 45.5 feet, and another 241.5 feet in two years. The number of glaciers increases from west to east—that is, according as the height of the main ridge increases.

POLAR.

THE MELVILLE-BRYANT DRIFT CASKS.—At a meeting of the Geographical Society of Philadelphia on Nov. 1, President Bryant reported the recent recovery of two of the drift casks that were set afloat by the Society in the Arctic Ocean north of Bering Strait, in the hope that the recovery of some of them might throw new light on the direction of Arctic currents. President Bryant said in part:

I am able to announce that two of the drift cask messages have been received in Philadelphia. The

first record shows that it was cast adrift by Captain Tuttle of the revenue cutter *Bear* on Aug. 21, 1901, about 85 miles northwest of Wrangell Island. It was recovered by Captain A. G. Christianson on Aug. 17, 1902, near the entrance to Kolyuchin Bay on the Siberian coast, west of Bering Strait. It is evident that this cask did not get a good start. In the one year less four days of its drift the course it followed of 380 miles to the southwest was probably influenced by local currents which exist near Bering Strait.

The other cask had a longer voyage, and doubtless a more eventful history. Placed on the floe ice northwest of Point Barrow, Alaska, in 71° 53′ N. Lat. and 164° 50′ W. Long , by Captain Tilton of the steam whaler *Alexander*, on Sept. 13, 1899, it was recovered 1 mile east of Cape Raudanupr, on the northern coast of Iceland, on June 7, 1905.

Mr. Bryant read the following from a letter written by Admiral Melville:

More of the casks have come through, but have not been found; while others, no doubt, have been found but not reported. There is no telling how long the cask found in Iceland drifted about in open water before it was cast ashore. A ship drifting the same way, no doubt, might have come through two years earlier. . . . No doubt others have passed around Cape Farewell, Greenland, and are now on the west coast, and if they are not picked up will . . . eventually come south in the Labrador current. We will yet hear of more of them.

Size of Antarctic Icebergs.—Capt. Robert F. Scott (*Geog. Journ.*, XXV, 1905, p. 356), speaking of the huge tabular icebergs of the Antarctic, states that of the hundreds of icebergs seen by him few exceeded a mile in length and 150 feet in height, while the vast majority were less than a quarter of a mile across. The largest iceberg seen was estimated to be 5 or 6 miles in length and to have about the same width. In the same region one iceberg was estimated to be 240 feet high. Captain Scott considers that Murray's estimate of seven parts below water to one above is too high, and that five to one is nearer the truth. This conclusion he bases upon the (1) shoalness of water in which the bergs were aground, (2) an eye estimate of the proportion indicated by an overturned iceberg, and (3) the appearance of the ice, which apparently contains much air. Among his illustrations is an excellent picture of a typical iceberg. R. S. T.

VARIOUS.

Report of the Eighth International Geographic Congress.—The United States Congress authorized the printing of this "Report" at the expense of the National Government. It contains 1064 pp. Of the papers offered to the Congress, 119 are printed in full or in abstract. They include nearly all the contributions read at the Congress; but, unfortunately, a number of notable papers do not appear, as, for one reason or another, the manuscripts were not obtained by the Printing Committee.

The reports of these International Congresses have been welcomed by teachers of geography in European Universities as valuable sources of reference. The present volume will be included in this list of worthy books, though naturally, the Congress having been held so far from European centres of geographical interest, it was much smaller than its predecessors, and its literary output was by no means so large. It would be pleasant to meet with fewer typographical errors in the book, but criticism in this and other matters is practically disarmed by the fact that the task of preparing this large volume for the press was a gratuitous labour on the part of the Printing Committee.

Centennial of the Trip of Robert Fulton's First Steamboat.—To mark the centennial of the trip of Robert Fulton's first steamboat in the Hudson River, in October, 1807, the Committee on Plan and Scope of the Fulton Centennial Commission has recommended the construction of a memorial arch in Battery Park and

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the establishment of a marine museum, on a basis similar to that on which the Metropolitan Museum of Art and the American Museum of Natural History were founded.

BULLETIN OF THE GEOGRAPHICAL SOCIETY OF PHILADELPHIA.—It is announced that, beginning in January next, the *Bulletin* of the Geographical Society of Philadelphia will be issued every three months. Prof. Emory R. Johnson will be the responsible editor, and will have the co-operation of Mr. Walter Sheldon Tower as associate editor. The past year has been the most prosperous one in the history of the Society—judging by the increase in members and the general activity of the organization.

THE EXPLORERS' CLUB.—A club of this name has been formed in New York City with rooms at No. 23 West Sixty-seventh Street. Its membership is limited to men who have been engaged in exploration. The objects of the Club are to further exploration and to bring explorers together in social intercourse. It is intended to hold monthly meetings, at which illustrated talks will be given. The club has been organized with Brig.-Gen. A. W. Greely as President and Mr. H. C. Walsh as Secretary. The first meeting at the rooms was held October 26, when lectures were given by Mr. Frank P. Chapman, who described his studies of the flamingo, and Professor Herschel Parker, of Columbia University, who told of his experiences among the Canadian mountains.

THE COYOTE.—Too often the study of geographic conditions stops with physiographic and climatic factors. A paper by D. E. Lantz (*Bull.* 20, Biol. Surv. U. S. Department of Agriculture) entitled "Coyotes in their Economic Relations" emphasizes an additional point. Plant and animal life which man can bring into service, or which he must combat, may be a very important factor in the general problem of Geographic Influence. The author discusses the range, species, food, and habits of coyotes in North America. They may be found from Costa Rica to Athabaska, and from the Pacific to the Mississippi. Their exceeding numbers and their increase under the new régime of pioneer civilization, and added food supplies of poultry, lambs, sheep, calves, colts, pigs, and house refuse, are two striking features.

The coyote has been found beneficial, in that he feeds upon rabbits, prairie dogs, several kinds of rats and squirrels, and mice, all of which the farmer wishes to dispense with. But the animal does not stop with these classes of food. He catches weasles and skunks, which assist man in his warfare with injurious insects. He destroys game, as quail, grouse, wild ducks and geese, and even kills deer and antelope. Now that civilization has brought within his range many domestic animals which furnish a more savoury relish than the wild game, and that man has deprived him of much of the latter, by exterminating, at least locally, the wild animals formerly fed upon, the coyote shows his influence by visits to the poultry roosts, turkey ranges, duck ponds, pigeon cotes, pig pens, and sheep and calf corrals. Even the family cats kept as mousers have often been taken. He is most destructive, however, as an enemy of the sheep industry, which he has succeeded in driving out of many Western localities.

Poison, trapping, and even systematic hunting with Government bounties to pay expenses have not been effective in controlling this depredator. He has proved as formidable an obstacle to man's occupancy and utilization of much of the pasture land of the West as has the jackal to the development of ostrich, cattle, and sheep farming in South Africa and the rabbit to pastoral pursuits in

New South Wales, Australia. Experiments with various kinds of fence in the West are leading to the conviction that the coyote can be successfully mastered by artificial barriers. G. D. H.

COMPARING TEXT-BOOKS OF GEOGRAPHY.—In the *Elementary School Teacher* for October, 1905, is an article entitled "A Consideration of Geography Texts," written by Professor Kenyon of the San Francisco Normal School. It is devoted to a painstaking, judicial, and discriminating consideration of the modern school text-books of geography, and especially of the Redway, Morton, Tarr and McMurry, and Roddy series. The several books reviewed are all criticized as to the character of the maps, the author favouring the plan of having a physical map of a continent followed by a political map with the physical features underlying. The illustrations in the several books are not considered generally successful, though the results from wood cuts have certain advantages.

The general uniformity of the content is considered as being unfortunate, as it shows little real evolution in geographies in the last hundred years.

The following table showing the pages devoted to each division of the subject, with allowances for difference in the size of the pages, brings this out clearly:

	GENERAL GEOGRAPHY AND PRINCIPLES.	UNITED STATES.	REST OF NORTH AMERICA.	SOUTH AMERICA.	EUROPE.	ASIA.	AFRICA.	AUSTRALIA.	APPENDIX.
Redway.....	41	43	15	10	18	14	6	4	26
Morton.....	39	44	22	10	20	14	8	6	17
Frye.....	65	63	12	9	16	15	10	5	8
Tarr & McMurry.. (2d & 3d books)	57	80	16	14	55	16	12	10	16
Roddy.....	19	42	14	10	20	14	9	7	4

The author favours maps not on a uniform scale, as is illustrated in the Tarr & McMurry series, and commends especially the Frye and the Redway for the use of the necessary topical summary, wholly or largely lacking in the other books.

The conclusion that "A *bona fide* text will have two essential parts: one of these an atlas made up of maps and such tables of statistics as are needful in ordinary reference, the other a minutely specific course of study for the teacher's guidance," to which should be added a "copious fund of geographical readings," is undoubtedly theoretically true. As a matter of fact the plan of separating the atlas and the text has been tried twice in this country with absolute failure. To be effective such a text would need two atlases—one for school use and one for home use. The mechanical and practical difficulties are too many to make this plan effective in America, though it is carried out elsewhere.

The author's points as to the essential qualities of a text are accurate and clearly expressed. Any one seeking a text-book would do well to apply these points to any text as a measure of that text's efficiency. R. E. D.

OUR GEOGRAPHICAL LITERATURE.—Dr. Cleveland Abbe, Jr., of the United States Geological Survey, is the American collaborator for the Annual *Bibliotheca Geographica* of the Berlin Geographical Society. Dr. Abbe would be glad to

receive authors' separates at above address. If separates are impossible, full titles with limiting pages, numbers of illustrations, and volume reference should be sent. R. E. D.

GEOGRAPHY IN NEW YORK CITY SCHOOLS.—The Board of Education for the City of New York revised the course of study for the city schools in June, 1905. As a result the work in geography is somewhat simplified and the order of study of the continents has been somewhat changed. It is now necessary for a pupil to have studied North America, and especially the United States, in detail by the end of the fifth year. Hence pupils leaving school at this time, as so many do, will know something of their own country. Singularly enough, however, Africa, Asia, and Australia are studied in considerable detail—once in the sixth and once in the seventh year, while the United States are only studied in detail once in the fifth year. North America and Europe are studied in a large way in the first half of the seventh year, but not so as to give the best understanding possible of the salient geographic features of the home country. R. E. D.

DR. GILBERT'S GIFT TO DENISON UNIVERSITY.—*The American Geologist* says that Dr. G. K. Gilbert has given to the Department of Geology in Denison University upwards of 1,000 volumes of literature, consisting of U. S. Geological Survey reports, State Reports, reprints, proceedings, and other valuable books. It will be remembered that the library of the University was destroyed by fire some time ago.

PROFESSOR STEVENSON'S MAP STUDIES ABROAD.—Professor E. L. Stevenson of Rutgers College returned in October from Europe, where he carried on his map studies with gratifying results. His purpose was to give careful examination, in various libraries, to early cartographic material pertaining especially to America, to make search for hitherto unknown and unpublished material, to meet specialists, and to arrange for the reproduction of certain important early maps. He was so fortunate as to make two or three important finds, and to get on the track of valuable maps little known or altogether unknown. Arrangements have been made to continue the publication of fac-similes of early maps. Professor Stevenson's tour took him to England, France, Germany, Switzerland, Italy, and Spain, where officials, librarians, and specialists gave him every facility.

U. S. BOARD ON GEOGRAPHIC NAMES. DECISIONS NOVEMBER 1, 1905:

* BUCHAREST: City in Roumania. (Not Bucarest, Bukarest, Bukharest, nor Bukhorest.)

CEDAR: River in Eastern Iowa. (Not Red Cedar.)

* CHUCKEY: Post office and railroad station, Greene county, Tenn. (Not Chuckey City, Chucky, Fullen, Fullen's, nor Fullens.)

DE SMET: City, Kingsbury county, S. D. (Not Desmet.)

DELEVAN: Post office and railroad station, Colusa county, Calif. (Not Del Evan nor Delavan.)

DELRAY: Post office, railroad station, and village, Wayne county, Mich. (Not Del Rey, Delrey, nor Delrey Junction.)

DRY PASS: Passage between Kosciusko Island and Prince of Wales Island, southeastern Alaska. (Not El Capitan nor Klawak.)

* Reversal of former decision.

EAST NEW MARKET: Election District, post office, railroad station, and village, Dorchester County, Md. (Not East Newmarket, nor New Market.)

* KETCHIKAN: Post office and village on Revillagigedo Island, southeastern Alaska. (Not Kitchikan.)

* LITTLETON: Post office and railroad station, Jefferson county, Ala. (Not De Berniere.)

MANITICK: Mountain in Granby, Hartford county, Conn. (Not Manatick, Manatuck, Manitake, Manitook, Manituck, Mannatuck, nor Mantick.)

MOUNT WIESSNER: Mountain, Shoshone county, Idaho. (Not Mount Wiesner, Old Baldy, Wessner's Peak, Wiesner's Peak, nor Wiessners Peak.)

ST. JOE: River, tributary to Cœur d'Alene Lake, Idaho. (Not St. Joseph, St. Joseph's, nor St. Josephs.)

SOOES: River, Clallam county, Washington. (Not Suez, Tsoo-e-ez, nor Tzues.)

* SWANS: Island, Hancock county, Me. (Not Swan Island, nor Swan's Island.)

† VALETTA: Capital of Malta. (Not Valetta.)

THE GESELLSCHAFT FÜR ERDKUNDE, of Berlin, held a Memorial Meeting on the 29th of October, in honour of the late Baron Ferdinand von Richthofen.

A commemorative address was delivered by Prof. Dr. E. von Drygalski.

THE SOCIÉTÉ DE GÉOGRAPHIE, of Rochefort-s/Mer, announces the death of its President, M. Paul Charron, on the 9th of October, at the age of 73 years.

AMERICAN GEOGRAPHICAL SOCIETY.

ANNOUNCEMENT.—The next meeting of the Society will be held at Mendelssohn Hall, No. 119 West Fortieth Street, on Friday, January 5, 1906, when Dr. Otto Nordenskjöld will describe the incidents of the Swedish Antarctic Expedition.

NEW MAPS.

AFRICA.—Stanford's New Orographical Map of Africa. Scale, 1:7,286,400, or 115 miles to an inch. Four sheets. Compiled under the direction of H. J. Mackinder. E. Stanford, London, 1905. (Price, in sheets, 16s.; mounted on rollers, 20s.)

This map has been very carefully compiled for use in the school room. Six tints of blue show ocean depths to over 15,000 feet; 6 tints of brown show elevations above sea-level to over 15,000 feet; and olive green shows land below sea-level. Thus the deepening tints of one colour are used for the land and those of another colour for the sea. This simplifies the colour scheme, and, in the opinion of many teachers, is worthy of general adoption. The contour lines are drawn at the same intervals above and below sea-level, enabling comparisons to be made which emphasize the essential plateau character of Africa. The great submarine ridge extending through the mid-Atlantic, on which St. Helena and Ascension islands stand, contrasts most effectively with the bordering depths. In addition to the land-forms, many place-names are very distinctly printed.

* Reversal of former decision. † A curious decision.

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GALLA LAND.—Die Gallaländer. Nach den neusten Forschungsreisen gezeichnet. Von Carl Schmidt. Scale, 1:1,500,000, or 23.67 statute miles to an inch. Petermanns Mitteilungen, No. 10, 1905, Gotha.

An excellent specimen of compilation from original route surveys. Twenty years ago this large region east and west of Lake Rudolf was almost entirely white on our maps. Since that time eighteen exploring expeditions have traversed the country and supplied a large amount of data, which Mr. Schmidt, a member of the cartographic staff of the Justus Perthes house, has faithfully recorded. White areas of considerable extent still exist, these unexplored districts being chiefly in the east and in the northern part of British East Africa, which is still little known except along the proposed boundary between Abyssinia and the British possessions. Those American map makers who would like to study German methods of compiling maps from material found in the pioneer route surveys will find the sheet worthy of careful attention. The value of the map is increased by the fact that most of the surveys were much above the average quality of map results attained by African explorers; and a number of them, including the route surveys of the American explorer Donaldson Smith, rank very high as mother material.

UGANDA.—Surveys of the Anglo-German Boundary Commission on the southwest frontier of Uganda. Scale, 1:500,000, or 7.9 statute miles to an inch. By Lieut. Col. C. Delme-Radcliffe. The *Geog. Jour.*, Nov., 1905, London.

This frontier was delimited in 1902-4. The trigonometrical net of the Commission along the parallel of 1° S. Lat. and that of the British along the northwestern and northern coasts and islands of Victoria Nyanza are shown in an inset. The topography on both sides of the boundary line is denoted, many heights are indicated in feet, and on the margin the latitude and longitude of the 44 main triangulation stations are given.

AMERICA.

U. S. HYDROGRAPHIC OFFICE CHARTS.

Pilot Chart of the North Pacific Ocean, December, 1905. This chart is especially notable for the information it contains concerning the fishing banks in the North Pacific Ocean. Each fishing bank is designated by a number on the chart. On the reverse is a comprehensive table of the fishing banks, giving their names and positions, their approximate area, depth of water, nature of the bottom, and the kind and quantity of fish found on each bank. This information was compiled from publications of the U. S. Bureau of Fisheries and from other sources.

Pilot Chart of the North Atlantic Ocean, November, 1905. Red lines indicate the path followed by the centre of each of the more severe cyclonic storms during November in previous years.

CANADA.—Geological Map of the Island of Montreal and vicinity. Scale, 1:253,440, or 4 statute miles to an inch. Geological Survey of Canada, Ottawa, 1905.

Coloured to show the geological formations; geological section on the same horizontal scale.

CANADA.—Map of the City of Montreal and vicinity showing location of wells. Scale, 3,000 feet to an inch. Geological Survey of Canada, Ottawa, 1904.

The two maps above mentioned illustrate Mr. Frank D. Adams's Report on

"The Artesian and other Deep Wells on the Island of Montreal." Within fifteen years many borings have been made along the east side of the Island of Montreal to obtain water. Many of them are in the City of Montreal, and in most instances large supplies of good water have been obtained. The situation of each well is indicated by a coloured dot showing whether the water is potable, sulphuretted, or saline, or whether the boring is a dry one.

CANADA.—Geological Map of Pictou Coal Field, Nova Scotia. Scale, 3⅛ inches to a statute mile. Geological Survey of Canada, Ottawa, 1904.

Mr. Henry S. Poole has written a report to accompany this revised map of the Pictou coal field. A glance at the map shows that the field has been geologically much disturbed. The map does not show surface contours, but the directions of the underground levels at various depths are indicated.

CANADA.—Geological Map of parts of Counties Renfrew, Lanark, Lennox, and Addington, Frontenac, and Carleton (Perth sheet, No. 119). Scale, 4 miles to an inch. Geological Survey of Canada, Ottawa, 1904.

The map accompanies the report by R. W. Ells on the geology of a part of eastern Ontario. On the map margin are comprehensive notes describing the formations shown in colours on the map.

CANADA.—Geological and Topographical Map of the Klondike Mining District, Yukon Territory. Scale, 1:126,720, or 2 statute miles to an inch. Geological Survey of Canada, Ottawa, 1905.

Illustrates a report by R. G. McConnell on the Klondike gold fields. The topographical map on which the geological data are imposed was constructed by Mr. J. F. E. Johnston, largely from his own surveys. Mr. McConnell spent several years in collecting the geological data which appear in his report and map.

ASIA.

CENTRAL ASIA.—Map accompanying results of V. I. Roborovski's Expedition to Central Asia in 1893-1895. Scale, 1:4,200,000, or 66.2 statute miles to an inch. (In Russian.) Drawn under the supervision of Major-General Bolshev. Imperial Russian Geographical Society, St. Petersburg, 1900.

The routes of Roborovski, Kozlov, and other explorers are shown, and on these the positions of thirty-one places have been astronomically determined, these points extending between Issyk-kul and Zaisan-Nor in the northwest and Kuku-Nor and the Amne-Matshin Mountains in the southeast.

CENTRAL ASIA.—General Survey Map showing routes traversed by V. I. Roborovski and P. K. Kozlov in 1893, 1894, and 1895. Scale, 1:1,680,000, or 26.5 statute miles to an inch. (In Russian.) Four sheets. Drawn under the supervision of Major-General Bolshev. Imperial Russian Geographical Society, St. Petersburg, 1900.

Red lines indicate the route traversed by Roborovski, green lines show Kozlov's route, and black lines the routes of other explorers in the large region between Issyk-kul in the west and Kuku-Nor in the east.

CENTRAL ASIA.—Map of Nan-Shan. Scale, 1:840,000, or 13.2 statute miles to an inch. (In Russia.) Two sheets. D. Rudnef's Cartographical House, St. Petersburg, 1900.

This is a more detailed map of the surveys made by Roborovski and Kozlov in

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1893-95 in this mountain range in northeastern Tibet. The map is included in the Results of the Roborovski Expedition. Fifteen points were astronomically fixed.

CHINA.—Map of China. Prepared for the China Inland Mission. Scale, 1:3,168,000, or 50 statute miles to an inch. Four sheets. New Edition. London, Edward Stanford, 1905. (Price, 8s.)

The map shows the distribution of the China Inland Mission stations in red and those of other Protestant missions in blue. The geographic features are laid down with unusual care for publications of this nature; and as the scale is much larger than that used by atlas sheets generally, the map will serve well in many respects for general reference. Heights are given in feet, railroads in operation, building, or proposed, are included, and symbols indicate the importance of the towns.

BRITISH INDIA.—Ceylon. Scale, 1:1,013,760, or 16 statute miles to an inch. Report of Surveyor-General, P. D. Warren, Colombo, 1905.

Shows in colours the topographic surveys carried out between 1897 and 1904, the block surveys in the same period, and the regions under survey in 1905.

AUSTRALIA.

WESTERN AUSTRALIA.—Map of Western Australia showing the Geological Maps issued since 1896. Scale, 75 statute miles to an inch. W. D. Johnson, Minister for Mines, Perth, 1905.

The map accompanies the Progress Report of the Geological Survey for 1904.

EUROPE.

CENTRAL EUROPE.—Liebenow-Ravenstein's Special-Radfahrerkarte von Mittel-Europa. Nos. 33 Hamburg, 55 Amsterdam, 84 Cologne, 99 Frankfort on Main, 123 Paris, 143 Munich. Scale, 1:300,000, or 4.7 statute miles to an inch. Verlag Ludwig Ravenstein, Frankfurt am Main, 1905. (Price of each map, M. 1; mounted to fold, M. 1.50.)

Specimen sheets of an excellent cycling and automobile map of Central Europe in 164 sheets. The roads are distinguished according to their importance for bicycling and automobile purposes. Dangerous places where special care must be taken are designated by red dots, distances between the more important points along the roads are given in figures, and much other information needed by travellers along the highways is supplied. On the Frankfort sheet the Gordon-Bennett automobile route of 1904, roughly in the form of an ellipse, between Weilburg in the north and Homburg in the south, is indicated.

LOWER AUSTRIA.—Schulwandkarte des Erzherzogtums Österreich unter der Enns. Compiled by J. G. Rothaug and Prof. Friedrich Umlauft. Scale, 1:150,000, or 2.38 statute miles to an inch. Four sheets. G. Freytag & Berndt, Vienna, 1905. (Price, unmounted, M. 13.50; mounted on linen with rollers, M. 17.)

A superior large-scale school map of the comparatively small area embraced in Lower Austria. The map is based on trigonometrical surveys; light and shade as well as contours are used to express the forms of the land. It includes both the plain and the mountain country surrounding Vienna and gives an effective bird's-eye view of land-forms, drainage distribution, comparative importance

of the towns, etc. Geographical students of lower Austria in the middle grades and their instructors are certain to find this map helpful.

TURKEY.—Zur Geologie von Nordalbanien. Scale, 1:1,500,000, or 23.67 statute miles to an inch. *Jahrbuch* der k. k. geologischen Reichsanstalt, Band LV, 1905, Vienna.

Accompanies a report by Dr. Franz Baron Nopcsa. The author's investigations in the north and central districts supplemented the work of predecessors in other districts, and thus made it possible to produce this geological sketch map in colours.

ENGLAND.—Salisbury Plain District. Scale, 1:126,720, or 2 statute miles to an inch. John Bartholomew & Co., the Edinburgh Geographical Institute, Edinburgh. (Price, 1 sh.)

One of Bartholomew's superior maps for tourists and cyclists. Roads, distinguished as first-class, good, and passable, are in red, seven tints show differences in elevations, and sea depths are given in three shades.

SCOTLAND.—Bathymetrical Survey of the Fresh Water Lochs of Scotland. Scale, 1:21,120, or 3 inches to a statute mile. Under the direction of Sir John Murray and Laurence Pullar. The *Geog. Jour.*, Nov. 1905, London.

The lochs included on these plates are Shin (upper and lower sections) Merkland, a'Ghriama, Fiodhaig, and seven smaller lochs, all in the Shin basin, excepting Loch Buidhe of the Fleet basin. Like the other plates in these series they are in the best style of the Bartholomew house of Edinburgh.

NORWAY.—(1) Kart over det Nordlige Norge. Scale, 1:1,000,000, or 15.8 statute miles to an inch. With inset of the Lofoten Islands on a scale of 1:400,000, or 6.3 statute miles to an inch. (2) Kart over det Sydlige Norge. (In four sheets.) Scale, 1:600,000, or 9.4 statute miles to an inch. By Oberst Nissen. H. Aschehoug & Co., Christiania, 1905. (Price, North Norway, kr. 2.75; Northwest sheet of South Norway, kr. 1.50; other three sheets of South Norway, kr. 2.50 each.)

These are tourist maps which also serve well as general maps of the kingdom, as they are on much larger scales than the usual atlas sheets, give practically the complete geographical nomenclature of Norway clearly printed, and show the drainage, mountain features, and coast-lines. Roads and paths are shown in red. The four-sheet map of South Norway is accompanied by an index of names.

POLAR.

ANTARCTICA.—Sketch map to illustrate the paper by Dr. Charcot of the French Antarctic Expedition, 1903-5. Scale, 1:2,500,000, or 39.45 statute miles to an inch. The *Geog. Jour.*, Nov., 1905, London.

The map shows the route and surveys of the expedition along the west coast of West Antarctica and distinguishes the coasts that were surveyed, or first seen by this expedition. Insets show Wandel Island on a large scale with the winter quarters of the party; also the route of the ship from and to South America.

ATLASES.

ATLAS UNIVERSEL DE GÉOGRAPHIE.—Ouvrage commencé par M. Vivien de Saint-Martin et continué par Fr. Schrader. 90 Cartes. No. 66 Afrique Française,

Feuille III (Madagascar et Dépendance). Scale, 1:5,000,000, or 78.9 statute miles to an inch. Hachette & Co., Paris, 1905.

The map is based upon the large-scale maps published by the Geographic Service of the French Army between 1889 and 1903. This more exact information, generalized and finely engraved on steel, results in the best atlas sheet of Madagascar up to this time. There are three insets: the central part of Madagascar from the Indian Ocean inland on a scale of 1:1,250,000, or 19.7 statute miles to an inch; the island of Réunion on the same scale, and the French Somali coast on the same scale as that of the main sheet.

BOOK NOTICES.

Das Alter der wirtschaftlichen Kultur der Menschheit. Von Ed. Hahn. Heidelberg, Carl Winter's Universitätsbuchhandlung, 1905. 246 pp. (Pr., M. 6.80.)

Students of the history of primitive man will find many interesting contributions to their science in this book, which represents a summary of the life-work of the author in this line. One of his main objects is to disprove the traditional idea of an evolution of the human race through the stages of hunter, herdsman or nomad, and agriculturist. While the fact remains that these stages of culture have alternated at different periods in the history of primitive man, the results of modern ethnology no longer allow the acceptance of their universal succession in the order named.

The first observation which spoke against this popular tradition was made by Alexander von Humboldt, who found that almost all the native tribes of South America practised some form of agriculture, while, with the single exception of the Incas, no attempts at the domestication of animals were ever observed. The author's own studies of domestic animals and the history of their domestication corroborate Humboldt's statements.

In speaking of domestication, especially of that of cattle, two aspects of the question must be kept apart—viz., the use of the animal as draught cattle or as carriers of burdens in general and as producers of food, especially of milk. The negroes of Central Africa, for instance, keep large herds of cattle for the sake of their milk, but never thought of using them to draw or carry anything before the arrival of the whites. They, too, like the South American tribes, have some agriculture without ever having put an animal to the plough. This and similar observations lead the author, with Ratzel, to distinguish two entirely separate forms of agriculture by the names of hoe-culture and plough-culture. The former is the one found with primitive peoples all over the globe; it consists in the planting of seeds or roots by means of simple tools of a more or less hoe-like shape. The plants, or clusters of plants, grow in small hillocks, which may be heaped up more or less regularly; and while the land thus cultivated may, when laid out with some care, present an appearance not very different from a regular field, it will upon closer investigation always be characterized by the entire absence of furrow-lines. A field under plough-culture will, on the other hand, always be characterized by the conspicuous lines drawn by the plough, which means that

man has discovered the secret of enlisting the strength of an animal and of using a mechanical device in order to avoid the hardship of manual labour which is connected with hoe-culture. Plough-culture is, therefore, found exclusively with races possessing an old and highly-developed civilization. Whenever the word "agriculture" has been used so far, it has been synonymous with plough-culture, which, without the other, is indeed the highest of the culture stages. In the new understanding it can no longer be used to denote this stage; for, as hoe-culture, it stands at the beginning of all civilization.

Upon this basis, the author's results are, in short, as follows: Taking the use of fire as the starting-point of civilization, the first modification of the traditional scheme must be made concerning the hunter stage. Hunting presupposes a definite purpose and plan to secure possession of some game, which is more than can be expected of primitive man at his start. The study of the lowest races of the present rather shows that in this stage man gathers whatever comes in his way and seems fit to eat, animal or vegetable alike. Thus the gathering stage preceded that of the hunter, and remnants of the same are still found among the aborigines of Australia. At a later stage a division of labour takes place. Man goes out to get the game, but he is far from living on flesh food exclusively; he charges the women of the tribe to get the vegetable contribution to the meals. In proportion as he, from a mere gatherer, rose to the stage of hunter, woman was by this division of labour made the first agriculturist; hoe-culturist. Half-eaten roots covered with earth, together with other remnants of meals, or roots and fruit buried in the ground as offerings for the dead, would sprout and grow, and thus eventually teach the women how to secure vegetable food with less trouble. Consequently, wherever agriculture (*sc.*, hoe-culture) is found with primitive peoples, it is the women who till the soil, while the men hunt, go to war, or do nothing.

Many evidences furnish proof that also in the parts of the world now given over to plough-culture, the latter was preceded by hoe-culture in primitive times. Its main product was millet, the venerable old food-stuff, which figures in all the Germanic folk-lore as the national food, and forms the contents of the magic boiler which is never empty. Its almost universal propagation, from the polar circle to the subtropics, would alone speak for its age; but there is also unquestionable evidence of its cultivation among the relics of the lake dwellers. To-day millet is hardly known as a food-stuff to the people at large, and in its place we pray for our daily bread—one of the most graphic illustrations of the supplanting of the hoe by the plough.

Concerning the transition, too, from the hunting to the nomadic and from the nomadic to the plough-culture stage, important modifications must be made. The familiar idea of man having been attracted by the cow's milk, and having, therefore, begun to keep cattle, after which he started putting the ox to the plough, must almost completely be abandoned. Even if there were not the difficulty of taking a product which is the result of domestication as the cause of the same, two most important civilizations stand out as unmistakable proofs of the fallacy of the milk theory. The first is China, where from time immemorial the ox has been the helper of the ploughman, but where nobody has ever seen a native touch milk; the other is ancient Peru, where the only domestic animal of prehistoric America was bred; while there is not even the record of an attempt to milk the llama.

Turning again to the primitive nations of the present to furnish us a key for the past, the author finds a more probable incentive for the domestication of

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animals in the love of pets found with certain primitive tribes. According to von den Steinen, for instance, the homes of the Indians of central South America are zoological gardens on a small scale, so full are they of animal playmates of their inhabitants. In a similar way the smaller of our present domestic animals—the dog, sheep, and goat—were probably first chosen for companions of man, and their confinement would not be so close as to prevent them from breeding, the main difficulty encountered in the study of the beginnings of domestication being that animals suddenly deprived of their liberty will not breed. In proportion as man became familiar with the characteristics of the different animals he would find out that they were good for more than mere comradeship, and use them as carriers of burdens, and the experience acquired in contact with the smaller animals enabled him to experiment also with the larger ones—the donkey, the camel, the horse, etc. With those at his command, the development of nomadic life was only a question of time.

Even nomads, however, did not live on the flesh or milk of their herds exclusively, but on their respective halts set the women's hoes to work to furnish the supplementary dishes, or preyed upon the neighbouring agricultural (*sc.*, hoe-cultural) tribes for vegetable contributions. Thus agriculture, far from following the earlier stages, is, in the form of hoe-culture, contemporaneous with each, and actually the oldest of any culture recorded.

The surprising fact (which cannot be denied, in face of the author's evidence) is that the plough-culture has nowhere developed from hoe-culture. The use of the plough drawn by the ox or horse appears as something entirely novel, and radically incongruous with anything that preceded it. So wide is the gap between the two stages that to the Greeks nothing short of a miracle could explain the invention of agri-(*sc.*, plough-)culture, and modern science, too, has as yet been unable to bridge it over. Wherever plough-culture now takes the place of the older form, it must have been introduced as an entirely foreign element, originated, perhaps, many thousand miles away on an area especially adapted to its development, and spread from there over its present area, supplanting the hoe by the plough, and the hoe-products by the cereals.

The author looks upon Babylonia as the original centre, and his argumentation is as follows: The foundations of plough-culture are twofold—the invention of the plough, and the putting the ox to it. The plough cannot have been the first vehicle to which the ox was put, as an animal which is yet to be broken in will never cut a straight furrow. The ox must have been accustomed to harness-work before he was made to plough—in other words, the chariot or the wheeled vehicle must have preceded the plough.

Ths author traces the invention of the wheel back to the old forms of worship in which the idols were carried in processions. When they proved too heavy for the carriers, they were drawn along, and wheels attached to the statues. To raise them high above the crowd, they were placed on platforms with wheels attached to them: the first chariots. When the priests who originally hauled the vehicle came to be replaced by a draught animal, the ox was chosen because he was sacred. It is well known what an important part the moon played in the religion of Babylonia , and the resemblance of the horns of ox and cow to the crescent was early noted. Herds of cattle, therefore, were early kept in enclosures near the temples, in Babylonia as well as in other countries, and this was the first step at domesticating cattle. Cow's milk, as a sacred fluid, was consecrated to the gods as food in the regular offerings, just as bread was offered in the Hebrew cult (an

interesting instance how precious, and therefore new, the product of plough-culture must have been in Palestine when the Mosaic laws were given). We know who, in fact, ate similar offerings, and very probably it was through the priests that the use of milk was established among the people. When it came to choosing a draught animal for the sacred chariot, none could be better suited for the purpose than the ox, already attached to the service, and probably fitted for it by a special consecration, as in other cults. In this way the ox was trained to harness, and the subsequent putting it to the plough was a natural step.

The invention of the latter, too, can be derived from a religious act. The first ploughing was probably a kind of consecration of the soil, a symbolical fertilisation of the field. The loosening of the soil by the sacred animal would naturally bring better results than that done by an ordinary mortal; thus the hoe was attached to the ox, and, changing its vertical position to a horizontal one, the first primitive plough ripped the earth and cut the first furrow. In a hard-baked soil, such as the rich alluvial bottom-lands form in a climate like that of Babylonia, the difference between the vegetation along the lines of loosened soil and that on the hard stripes between will soon show, and thus the Babylonian farmer learned the lesson of planting his seeds in the furrows.

The geographical condition of the land of its origin is responsible also for another characteristic of plough-culture. In a steppe climate, agriculture is possible only through irrigation; and we know what was done in this line in Babylonia. But irrigation requires farming on a large scale—a combination of the individual fields into one large area, over which the water is conducted. Such space was not available in the city; the fields had to be far away from the homes, outside the city walls. There women could not be allowed to work, and thus plough-culture grew up as man's work; while hoe-culture, which could be pursued near the home, was the work of the women. Thus it comes that all over Europe, among the old resident farmer population who preserve the traditions of their fathers, the farmer takes care of, and sells, the products of the fields, while the wife has the care and income of the vegetable and fruit garden, the only part of farming in which hoe-culture has survived to the present.

It has been considered desirable to give the book a more detailed review than is generally accorded to books of its size, because it is not very probable that it will find many readers in this country, on account of the crabbed and difficult German in which it is written. While literary perfection is not the foremost requirement of a scientific book, neglect of clearness has certainly been carried too far in this instance. Not only is the style one of the best illustrations of the ill-famed "Gelehrten-Deutsch," which it requires a special effort even for the native to read, but the presentation of the subject is also interspersed with so many digressions of a personal or political nature that the unity of the plan is entirely destroyed. A revision from these points of view before another edition is made would certainly contribute very effectively to secure for the author a wider recognition of his work. He now complains of the lack of this recognition, which he fully deserves. M. K. G.

Explorations in Turkestan, with an Account of the Basin of Eastern Persia and Sistan. Published by the Carnegie Institution, Washington, 1905.

This fine volume embodies the results of an expedition in 1903, under the direction of Professor Raphael Pumpelly, who was assisted by Professor W. M. Davis,

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Mr. Ellsworth Huntington, and Mr. Raphael W. Pumpelly. Of the five papers offered, the first is introductory, by Professor Pumpelly, and bears the title, "Archeological and Physico-Geographical Reconnaissance in Turkestan." The general purpose was to make a preliminary examination of the Trans-Caspian region, preparatory to further study of problems of early human occupation and accompanying physical changes. In both these fields Turkestan is characterized as a virgin territory promising large results to detailed studies, town sites and tumuli are named for definite beginnings, and the important physiographic problems are stated.

The second paper is by Professor Davis, and gives an outline of physiographic observations. Following the order of his itinerary, he describes the Bosporus as a normal river valley, submerged since the advent of man. He also gives evidence suggesting the conclusion that the Caspian and Black Seas may have been confluent before the sinking of the Bosporus region. He studied the Quaternary shore-lines of the Caspian near Baku, where strands occur up to about 600 feet, but not as well worked as those of Bonneville or Iroquois. On the east of the Caspian, at Krasnovodsk, and in the Balkan Mountains, shore-lines at 200 feet or a little higher suggest probable warping, when compared with those at Baku.

There is a discussion of the Aralo-Caspian Basin in the Kara-Kum, of desiccation and the development of the Usboi channel as an old outlet from the Aral to the Caspian waters. Vast aggrading plains lie at the foot of the mountains of Turkestan, and these are believed to be largely fluviatile, in harmony with the later trend of opinions concerning similar deposits on the Great Plains of the United States. There are interesting references to the loess, followed by observations in the Tian Shan Mountains.

Mr. Raphael W. Pumpelly describes physiographic features of the Pamir, and Mr. Huntington presents two extended essays of great interest, one giving a reconnaissance in Central Turkestan, and the other describing the Basin of Eastern Persia and Sistan. All of the observers unite in the conclusion that there are evidences of two, three, and even five epochs of glaciation in certain of the localities, with long interglacial intervals in at least some cases.

Fruitful efforts were made, in the direction of correlating the glacial expansions, both with great block uplifts of strata and with the terraces cut in vast volumes of valley waste, and with the fluctuating levels of the lakes, and it is believed that these physical changes can be placed in their true relations with the human occupations of the region.

Mr. Huntington's explorations in Persia continued his work through the winter of 1903-04, and his report is a paper of profound interest. The basins of Eastern Persia are remote and little known, being a region rimmed about with lofty mountains, and receiving enormous deposits of waste to form its endless plains. Persia is described as a "typical example of an arid country," and we have in Mr. Huntington's paper perhaps the most direct and fruitful attempt yet made to correlate land-forms with climatic conditions.

Both continental position and its basin character contribute to the aridity of Persia. The basins are due to warping, but this is not of a peculiar sort. Basins must also have been formed by the making of the Alps and the Himalayas, but in those well-watered regions streams or lake outlets have effectively cut the rims of the basins and kept a connection with the sea. But in a closed region like Persia there stretch endless fans and floors of the waste which can make no escape to the sea. Lacustrine and river terraces show climatic oscillation which may have continued into the historical period.

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The closing pages discuss the relations of climate and history, and show how the data of history, tradition, and physiography tell the same story of modern desiccation of the land. A. P. B.

An Introduction to the Geology of Cape Colony. By A. W. Rogers, Director of the Geological Survey of Cape Colony. 451 pp. With many illustrations and a colored geological map. Longmans, Green, and Co.

The formal survey of the Colony was undertaken in 1896. This volume is designed as a popular manual, by which students and other residents of the Colony may learn the structure of their own land.

The southern margin of the Colony consists chiefly of much-disturbed formations of the Cape Period, the beginning of which is given as early Devonian. Pre-Cape rocks also exist in the south and over large areas along the west coast. The great central basin, however, and the larger part of the Colony, show rocks of the Karroo System, apparently of Permo-Carboniferous and early Mesozoic age. It would be much to the convenience and enlightenment of the average reader if the local names were more clearly correlated with the general nomenclature of geological periods. The fossils of the Karroo rocks are all of land or fresh-water kinds, and the maximum thickness of the beds is not less than 14,000 feet.

Perhaps the most interesting fact in the volume is the evidence for widespread glaciation in the Dwyka, or early Karroo areas. Thus it becomes essentially contemporaneous with the glaciation shown by the Gondwana System of India and the Permo-Carboniferous ice accumulations of Australia. Whatever the cause, it must have been existent over a wide region of the earth's surface, and can hardly have been due in any degree to great altitudes.

The evidence for glaciation is scarcely open to question. Thus large blocks rest in a matrix of sand or mud, and show the agency of icebergs. Conglomerates reposing on a striated floor are interpreted as ground moraine. In some cases *Roches Moutonnées* and "crag-and-tail" structures are found under the conglomerates. A striking view of a glacially-scratched surface is given on page 157. The range of localities in the Colony is also great, giving the general conclusions a high degree of certainty.

Interesting evidence is also given of a former cycle of denudation, resulting in a peneplain leaving remnants, in the southern parts of the Colony now often 1,000 feet or more above the sea. High-level terraces and gravels also appear from 600 to 1,000 feet above the present river beds. Thus the Table Mountain series shows its much-folded masses, with flat tops, and dissected by the rivers, which have been rejuvenated in the uprising of the land, and in the inauguration of a new cycle. As a natural accompaniment of these changes are the "numerous S-curves" mentioned by the author—incised meanders between cliffs several hundred feet in height.

Among the superficial deposits are eolian limestones attaining a thickness of 500 feet. Natural salt-pans, both along the coast and inland, are described, and theories given as to their origin. Of human remains such chipped implements as have been found are of no great antiquity. A. P. B.

Konstantinopel und das Westliche Kleinasien. By Karl Baedeker. xxiv and 275 pp., 9 maps, 29 plans, 5 sketches and Index. Karl Baedeker, Leipzig, 1905. (Price, M. 6.)

This volume has recently been added to the long series of Baedeker's guide books. The six chief routes to Constantinople are considered in turn as the

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tourist is likely to approach the capital of Turkey by way of Budapest, Constantza, Galatz, Odessa, Athens, or Salonica. The routes are described and a number of maps of the chief towns along the way, as well as the starting-points, are inserted. Sixty pages are given to Constantinople, followed by twenty-five pages describing the excursions from that city, on the Bosporus, to Brusa and its neighbourhood, and to many points on the Anatolian railroad. The remainder of the volume deals with journeys to the western part of Asia Minor, including Smyrna, Ephesus, the Plain of Troy, and the Turkish islands in the Ægean Sea.

It is a curious fact that the zeal of the Turkish censor is directed towards the confiscation of guide books. If tourists, however, are careful, when they cross the frontier or enter one of the Turkish ports, to slip their guide book into a pocket, they may retain possession of this valuable accessory, as the vigilance of the authorities seems to be confined to the custom houses.

Christianity in Modern Japan. By Ernest W. Clement. viii and 192 pp. Map, half tone Illustrations, Appendix and Index. American Baptist Publication Society, Philadelphia, 1905 (Price, $1.)

The book presents a general survey of the work of Christianity in Japan. The subject is not covered in great detail, but a comprehensive view of the whole work and its results is given and an adequate bibliography is included, which will enable those who desire to go into the question more deeply to find the best books on the topic in our language. Many excellent photographs show churches, schools, and other features of the work. It may be worth noting that in this Protestant publication the long labours of the Roman Catholics in Japan are treated with the highest appreciation.

Handbuch der Heidekultur. Unter Mitwirkung von Otto von Bentheim und andern Fachmännern. Bearbeitet von Paul Graebner. viii and 296 pp., 48 figures in the Text, Map and Index. Wilhelm Engelmann, Leipzig, 1904. (Price, M. 9.)

This is a detailed account of the heath lands of Germany and how they may be made profitable. Dr. Graebner has for years given great attention to the scientific study of these heaths, or moors, and his views as to the method of their formation have been very generally accepted. In his opinion they may develop on sands or under water, but in north Germany at least, and probably in other countries, they may have taken the place of forests. He attributes the disappearance of the forests and their replacement by the various types of heath vegetation chiefly to the removal of salts by percolating waters. Another fact that he emphasizes, though not so strongly as some other writers, is the absence of air in the soil, which, as well as the very poor quality of the soil, has its part in making the heaths and their meagre vegetation what they are.

There is a considerable amount of purely scientific matter in the book, but the purpose of the volume is chiefly practical. How may the heaths of Germany be turned to good account? This problem is discussed by Mr. von Bentheim, who advises deep ploughing as an essential preliminary. The preparation of the land for farming or tree-planting is discussed in detail, and the view is expressed that in many cases Government co-operation, or at least a union of the farmers into societies for mutual helpfulness, will be necessary in the reclamation of these lands. The book concludes with a study of the various forms of vegetation from a botanical standpoint.

Das Sonnenwendgebirge im Unterinnthal. Ein Typus alpinen Gebirgsbaues. Von Dr. Franz Wähner, o. ö. Professor an der K. K. Deutschen Technischen Hochschule in Prag. Erster Teil. Mit 96 Lichtdrucktafeln und einer geologischen Übersichtskarte. Leipzig und Wien, Franz Deuticke, 1903.

Another of the large monographs devoted to special problems of Alpine geology. The Sonnenwendgebirge is one of the northern front ranges of the Tyrolese Alps, N.E. of Innsbruck, on the E. shore of the Achen Lake. It had hitherto been considered one of the less-disturbed parts of the Alps, but Dr. Wähner has found that this region, too, like so many others in those mountains, is full of unconformities resulting from overthrust flexures.

The Main Dolomite underlies the whole of it in mighty strata which are gently inclined toward the south. The crests of the individual ridges consist of younger formations, mainly of the author's "White Reef Limestone" (=Upper Dachstein limestone) and Jurassic limestones and hornstones. There is a marked difference in the structure of the eastern and western parts of the range. In the latter, four parallel ridges run E.N.E.-W.S.W., one of Dachstein and one of Jurassic rock alternately; while in the western ridges the relation between the orographic and geological features is much less pronounced. A still larger difference exists between the northern and southern parts of the region; the rocks of each correspond so little to those of the other, and the systems of folds are so radically unlike each other, that nothing but the hypothesis of a separate genesis of each can account for the differences.

A great part of the younger formations having been worn away, the denuded slopes of the ridges offer many good exposures of the contorted strata. By tracing a stratum of marly limestones of the upper Rhaetic, a facies of the Koessen beds, the author succeeds in ascertaining that the astounding thickness of the Main Dolomite (more than 6,000 feet) is due to its being folded over on itself several times, so that flexure fractures and faults occur along the synclines of the overthrust flexures, causing the more or less complete destruction of the intervening strata.

In the whole range the author distinguishes fourteen different sub-stages of Triassic and Jurassic deposits, from the Werfen shales to the Aptychus beds, and describes their palæontological, mineralogical, and stratigraphical characteristics, deriving from them the foundations for his explanation of the geological architecture of the region. In this part of the book a special study is made of a hornstone breccia which occurs between the Liassic limestones and the Aptychus beds. He calls it "Dislocations-Breccie" or "Druck-"(-pressure-)"Breccie," in opposition to the common breccias, which he designates as sedimentary. His definition of it comes very near the fault breccia of American geologists, and corresponds to the "breccia in situ" of Brögger. It is the product of the grinding of the rocks through the folding process, and consists of fragments cemented by finest rock meal, in which the original structure has been obliterated, and frequently a new process of crystallization can be observed. The fragments are full of fissures, several fragments can often be seen to come from the same original piece, their edges being serrated and the serrations interlocking at the junction of the edges in the way described by Suess as cranial sutures, and as pressure sutures by Rothpletz. At a very advanced stage of demolition the particles will show a kind of parallel structure indicating the direction of the pressure.

From such processes the author derives the formation of some marbles of that region. He denies the necessity of making the heat caused by the processes of

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mountain-making responsible for the crystallization of the limestone, because wherever the "white reef limestone" was found forced in between other rocks the crystalline structure increased in proportion as the stratum grew thinner. He explains this by the action of the percolating waters, which, as the crushing of the strata proceeds, get more and more access to the fragments, dissolve the carbonate of lime, and allow it to re-crystallize. The more completely, therefore, the process of grinding is done, the more complete will be the transformation of the ground substance into crystalline rock.

The rest of the book is given over to detailed descriptions of the single ridges and peaks which, while of high value for the specialist, cannot be duly appreciated in a general review. Of the same special value is the wonderful and exhaustive bibliography of the subject which precedes the presentation of the author's own work, and the illustrations are splendid instances of the scientific value of photography. M. K. G.

Das Neue Südafrika. Von Paul Samassa. 416 pp. C. U. Schwetschke & Son, Berlin, 1905. (Price, M. 5.50.)

This is neither a book of travel nor a volume of political essays, but an able and evidently an honest effort to portray South Africa in its present condition as it begins life anew with peace throughout the land. The region under the British flag, however, is now so vast and its interests and conditions are so varied that the whole subject could scarcely be treated in the compass of this book. The Governmental policy in Rhodesia, for example, and the serious misunderstanding between the white colonists and the Chartered Company are matters of grave import in the whole of north South Africa, but the author does not mention them. On the whole, however, he has certainly made a thoughtful contribution to the study of the country and of its leading problems. We have British views in plenty, but it is to the advantage of this book that it is written from the standpoint of the outside observer.

The author gives many facts relating to political and industrial life, and conveys the idea that, apart from its great mineral wealth, South Africa is really a poor land, and that agriculture can be developed only within narrow lines. He believes that a future uprising of the Boers is very improbable, and asserts that a process of the rapid "Africanization" of many of the English is now going on. He treats the native and labour questions, and says that away from the great trade routes "Cape Dutch," the language of the Boers, is more widely disseminated than English, and that the millions of blacks more easily learn to speak Dutch than English.

The Land of the Rising Sun. By Gregoire de Wollant. 8vo, pp. 401. Neale Publishing Company, New York and Washington, 1905.

A book upon Japan written by a Russian has a unique interest at this time. Mr. de Wollant's residence in Japan, as Secretary of the Russian Legation, was long enough to give him an intimate knowledge of the country and the people. This is shown in the first part of the book, which is devoted to the history, religion, customs, and superstitions of the people. The chapters upon literature, dramatic art, and the theatre are filled with information not usually found in the many books written upon this wonderful country. But the real interest of the book centres in the last two chapters, in which the author deals with Japan's foreign policy, her war with China and its results, and the war with Russia, which was in progress at the time the book was written.

It is surprising to be told that "Russia's occupation of Port Arthur was made necessary by the fact that Germany had gained possession of Kiaochau, and thus disturbed the balance of power,"when all the world knows that Russia, backed by Germany and France, forced from Japan the Liaotung peninsula, and thus fulfilled her century-old ambition to obtain an ice-free port on the Pacific. The occupation of Port Arthur was soon followd by the assumption of jurisdiction over Manchuria.

The history of this period is a record of protests from the other Powers and broken promises on the part of Russia. The responsibility for the war, which was inevitable, Mr. de Wollant places wholly upon Japan. He says "the moment had arrived for conquering Korea and spreading her domination in China." He adds "Russia did not want war and was not ready for war," but "she would not be an easy prey like China, and Japan played a hazardous game in beginning such a war." "One need not be a prophet to foretell that it will be disastrous to Japan."

The Yellow Peril is dwelt upon with considerable fervour. A Japanese writer is quoted as saying that "the mission of Japan is to civilize Europe and reconstruct on Japanese lines its moral and religious life." The United States will no doubt be included in this missionary work, but Mr. de Wollant's greatest fear for this country is in the direction of its commercial interests. He says "the time will come when the United States will *painfully* discover what the advent of Japan means."

The Russian original is not always perfectly rendered in the generally excellent translation by the author's wife. M. C. G.

The Philippine Islands. By Fred W. Atkinson. iv and 426 pp. Maps and Illustrations. Index. Ginn & Company, Boston. 1905. (Price, $3.)

This is, on the whole, the most convenient book to which we may refer for precise information about the Philippines. All who have occasion to look for special facts about nearly any phase of the islands or their peoples have doubtless been impressed with the circumstance that, although a great deal of material is now available, most of it has not as yet been so well arranged and presented in recent books, official or otherwise, as to give the reader a clear idea of the facts; or, at least, the student must hunt through many pages or in different books before he feels that he has satisfactory knowledge of the matter he is investigating.

The book brings within the compass of an ordinary octavo volume a systematic account of our new possessions; and we think it will be considered as the most handy and one of the most accurate sources of reference. The author was formerly our General Superintendent of Education in the Islands, where he travelled extensively and had unusual opportunities for observation. He has faithfully, and with much success, carried out his endeavour "to show the real conditions, geographical, economic, social, and political; to picture the people and their characteristics, the different phases of the problem of tropical colonies, the possibilities, and the prospects."

There is an index, and the illustrations are numerous and good.

Trois colonisateurs. Par le capitaine Froelicher, ancien officer de l'armée d'Afrique. Ouvrage couronné par la Société de Propagande coloniale. Avec 3 photographies et 4 cartes dans le texte. Paris, Henry Charles-Lavauzelle.

An interesting account of the ups and downs of French colonisation in Algiers,

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Senegambia, Tonkin, and Madagascar is here given by way of describing the colonial careers of the great founders of French colonial power: Bugeaud, Faidherbe, and Gallieni. In their historical sequence, the three men present three stages of the development of French colonial policy from its first beginnings in Algiers to the present. All three of them being soldiers, military occupation is naturally the foundation of their work, and the way in which each of them expands it into economic, and finally a moral, occupation illustrates in a striking manner the progress made by the French, and practically all the white nations, in the recognition of their responsibility toward their coloured wards. While the nature of the subject makes frequent repetitions necessary, the very minuteness of the records, which reflect with faithful accuracy both the successes and the reverses of France along the different lines of colonial expansion, makes the book very helpful reading for any one interested in our own colonial efforts, and for this reason ought to be read as widely as possible. M. K. G.

Notes d'Analyse Géographique. Conditions qui Déterminent la Valeur Économique d'Un Pays. Par Emile Chaix. IV and 48 pp., 43 Diagrams and Maps. Philippe Durr, Geneva, 1905.

Professor Chaix, who occupies the Chair of Geography at the Commercial High School, Geneva, has prepared these notes on the system of instruction which he has used for the past ten years. Many economic text-books print data that are not correlated with the principles upon which they depend. The memory of the student is thus unduly exercised, though the aim should be rather to cultivate his reasoning powers and facility in analysis.

Professor Chaix subordinates the memorizing of facts, and subjects the data to analytical treatment. The student is desired to reason out the economic value of a country from the prevailing conditions and to deduce the chief economic possibilities from physical and other facts before him. The book gives specimen analyses of the natural conditions in certain regions, and draws conclusions as to their effect upon organic and mineral productions, industry, communications, the inhabitants and their institutions, and the student is asked to make similar analyses relating to other countries. The book should interest many of our teachers. In its fundamental idea and its main features, however, this method is by no means unknown in many of the normal and other schools of the country.

Les Chemins de Fer Coloniaux en Afrique. Troisième Partie. Chemins de Fer dans les Colonies Françaises. Par E. de Renty. xii and 495 pp., 2 Appendices and 10 Sketch Maps. F. R. de Rudeval. Paris. 1905. (Price, 5 fr.)

This volume completes the important contribution that Captain de Renty has made to the history of African development. It is devoted to the railroads of the French colonial possessions, the two preceding volumes (BULLETIN, 1905, Aug., p. 511) having covered the ground for the other parts of Africa. The three volumes give the fullest and best account of the history and present condition of railroad development in the African colonies that has yet been written, and the work will be of enduring value as a record, sufficiently complete for most purposes, of the beginning and progress of these colonial enterprises up to the end of 1904.

The French railroads are treated with special fulness, and the history of each of them includes an adequate statement as to the nature of the peoples, regions, and climates through which it passes, so that the conditions in Africa which help

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or hinder railroad-building may be fully understood. In this sense, Captain de Renty's work contains much geographical information based on the latest and most detailed investigations. One of the appendices gives a table containing the statistics of all the colonial railroads in Africa now in operation or building up to Jan. 1, 1905.

A Handbook of Cyprus. Compiled by Sir J. T. Hutchinson and Claude Delaval Cobham. xii and 126 pp., Frontispiece and 2 Maps. Edward Stanford, London, 1905. (Price, 2sh., 6d.)

The fourth issue of this little book, which is a painstaking compilation of the matters most useful to know about the island. It is not a guide book of stereotyped pattern, but is especially valuable to those who may visit Cyprus, as the needs and wishes of the tourist are kept constantly in view. The black-and-white map is on a large scale, and gives a good idea of the land-forms, shows the roads, distinguishes Christian from Mohammedan towns, and prints place-names very fully. The small geological map is based on the larger map by Mr. Bellamy, published last year.

Baedeker de la República Argentina. Por Alberto B. Martinez. Second Edition. XV and 383 pp. With Maps and Plans of the Republic, Cities, Railroads, numerous Photographs, and Index. Jacobo Peuser, Buenos Ayres, 1904.

The introduction gives a description of the country, climate, agriculture, mining and other interests; also the cost of reaching Argentina by the various steamer lines. An unusually complete account of the city of Buenos Aires, with many illustrations, fills 137 pp. The various provinces are then treated in turn. The small pictures from photographs show many phases of Argentine life and industry, and the maps are on a sufficiently large scale to give all railroad stations and points of interest.

Amerikanische Landwirtschaft. Eine Reisestudie von Siegfried Strakosch. 187 pp., 56 Illustrations and 1 Map. Wilhelm Frick, Vienna. 1905.

The author in 1904 travelled through nineteen States of the Union studying the causes of the enormous development of our agriculture, and endeavouring to learn how much of it is due to "unequalled natural factors" and how much to improvements in farm methods. It is unfortunate that on his first page the writer should allude to "three great mountain systems—the Sierra Cascade Range, Rocky Mountains, and Alleghanies:" a slight confusion in our geographical nomenclature that seems to be merely accidental, for the description of our agricultural industries which follows is, on the whole, very clearly and accurately written. Mr. Strakosch states the facts that, in most cases, are best worth knowing, about the prices of our farm lands, the homestead and pre-emption laws, the scarcity of farm help and high cost of labour, the principal crops, the farm buildings, machinery, and cultural methods. He then describes types of farms in different parts of the country, our breeds of cattle and herd book societies, fruit culture, agricultural education, experimental stations, and many other influences which affect the standing of our great farming interests. Several chapters are given to the leading crops, grain elevators, transportation, the export trade, and the conclusions reached. The author attributes to the vast employment of farm machi-

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nery the fact that the United States are able to produce five times as much grain as Austria-Hungary, though that empire, according to the statistics of the Jahrbuch für das Deutsche Reich for 1904, says that farming and forestry employ 10,512,019 persons in the United States, while in Austria-Hungary they employ 12,679,974. The book concludes with statistical tables which, like all the contents of the volume, are well selected and arranged.

Mohammed and the Rise of Islam. By D. S. Margoliouth. xxvi and 481 pp., 31 Illustrations, 1 Plan, and 2 Maps. Index and Glossary. G. P. Putnam's Sons, New York. 1905. (Price, $1.50.)

Dr. Margoliouth, who is Laudian Professor of Arabic at Oxford, says in his preface that since the lives of Mohammed by Sprenger, Muir, and others were written "knowledge of Mohammed and his time has been increased by the publication of many Arabic texts and the labours of European scholars on Mohammedan antiquities." Some of these scholars have elucidated much that was obscure, facilitated the understanding of Arabian history both before and after the Prophet, and supplied many fresh details of interest and importance. The present book (Heroes of the Nations Series) has had the advantage of this new material. As the title of the series implies, the book is written from the standpoint that Mohammed was "a great man who solved a political problem of appalling difficulty—the construction of a state and an empire out of the Arab tribes." The author gives the sources of his references in very numerous footnotes. He has composed a work on Mohammed and the rise of Islam that is at once scholarly and interesting.

Carpenter's Geographical Reader. Afrika. By Frank G. Carpenter. 336 pp. American Book Company, New York, 1905.

Carpenter's Africa completes the well-known series of geographical readers, describing mainly personal experiences and observations of the indefatigable author-traveller. The text is simple and interesting, even though at times it is a bit patronizing, the descriptions are to the point, and the illustrations are, as a rule, clear. The text is made easy for the pupil reader by the insertion of the phonetic spelling of each unusual proper name, the first time that that name appears in the text.

The maps are good, and as accurate as maps can be of a country in which political boundaries are constantly changing. We wish that Cape Agulhas had been inserted, so as to help remove the common impression that the Cape of Good Hope is the most southern point of Africa. The author uses the unauthoritative spelling of Kongo State for Congo Independent State. These minor matters, however, do not materially weaken the strength of an otherwise valuable addition to reference material for school use. R. E. D.

Laboratory and Field Exercises in Physical Geography. By Gilbert H. Trafton. VI and 90 pp. Ginn & Co., Boston, 1905.

Trafton's Laboratory and Field Exercises is a simple, definite book for beginners in physical geography, and particularly adapted for use in association with Davis's Elementary Physical Geography. Of the sixty exercises in the book, thirty-seven are devoted to the land and twelve to the atmosphere. The exercises on the land are particularly good, as they involve a careful study of selected sheets of the topographical atlas of the United States Geological Survey. The

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book as a whole is more usable than several of its competitors, because it contains definite and detailed rather than general suggestions.

The several appendices include suggestions to teachers as to the use of the manual, as to the laboratory equipment necessary (this section being rather meagre), a bibliography of literature available on laboratory work, and a list of laboratory exercises suggested in several sources of reference. R. E. D.

A Laboratory Manual in Physical Geography. By Frank W. Darling. Chicago, Atkinson, Mentzer & Grover, 1905.

Darling's Laboratory Manual is almost unique in character, in that it is a manual of exercises, a note-book, and a partial laboratory equipment, all within one cover. It includes, in addition to the text, relief maps of the continents, outline maps of the world and the United States, ruled blanks for weather records, blank sheets for notes, cross section paper for construction of diagrams to scale, and a vegetation map of the world. More than two-thirds of the exercises are devoted to the land and the atmosphere.

The exercises are definite and practical, and, except for the topographic maps, on which are based most of the exercises in the book, the manual contains in itself the necessary material for laboratory use. Some of the exercises are, perhaps, too severe for first year high-school work, and the manual, therefore, is better adapted for use in the small but constantly-increasing number of schools in which physical geography is being taught, somewhat intensively, in the later years of the high school. Such manuals as this will help materially in making physical geography as definite and effective a subject in high schools as physics has so long been.

R. E. D.

An Outline Dictionary. Intended as an Aid in the Study of the Languages of the Bantu (African) and other Uncivilized Races. Edited by A. C. Madan. xv and 400 pp. Henry Frowde, London, 1905, (Price, 7s. 6d.)

The book has been prepared as a help in collecting vocabularies of the Bantu or kindred languages of Africa, or any other little-known language in an uncivilized country. It consists of a vocabulary of English words combined with a memorandum book for the recording of the foreign equivalents opposite the English words. Many suggestions are offered for the collection of native vocabularies and for spelling the words by the letters of the English alphabet. The book will be a convenience and a time-saver for investigators in this field.

Old Provence. By Theodore Andrea Cook. 2 vols. Vol. I, XXIII and 348 pp. and 44 photographic illustrations with maps and plans; Vol. II, xiii and 445 pp. and 34 illustrations. Charles Scribner's Sons, New York, 1905.

The author treats the history of old Provence with the same vivacity and charm of style that made his "Old Touraine" delightful reading. He had great wealth of material at hand, for Provence, in the delta of the Rhone, was the highway of the nations and the battlefield of the invader. The poetic, romantic, and dramatic elements in the history of Provence are handled with great skill in selection and in treatment. The work cannot fail to enhance interest in this region and to be a necessary part of the equipment of all Americans who visit it.

The first volume is devoted to this Roman empire on the Rhone, which is still illustrated by so many Greek and Roman monuments; the second volume

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carries the story down to the close of the fifteenth century through the Crusades and the era of the Popes at Avignon. Perhaps the best bit of geographical description is in Vol. I, pp. 24-28, which treats of the work of the Rhone River and the manner in which, following natural laws, so large a part of the stream has been rendered unnavigable.

Les Irrigations en Égypte. Par Julien Barois. iv and 386 pp. With numerous Maps, Sections, Profiles, Plans, etc. Ch. Béranger, Paris, 1904. (Price, 30 fr.)

Mr. Barois, a civil engineer of distinction long in the service of Egypt, published a study of irrigation in that country in 1887. Egypt has since then been so completely transformed that the present work is entirely new. The book is a large octavo, handsomely printed, and covering all phases of irrigation as it has been developed and applied to Egypt. The Nile, the source of irrigation, has a chapter, and the soil and sub-soil, the basins of inundation, the irrigation canals, the dikes, barrages, and every other aspect of water utilization are fully described. It is a book that will be useful in every country where irrigation is important. The author says he hopes that the knowledge of the subject he acquired in Egypt may, through his book, be made useful in the French African and Asiatic colonies.

Essais d'Hydraulique Souterraine & Fluviale. Par Edmond Maillet. vi and 218 pp. and 48 pp. of Tables. Paris, Librairie Scientifique. A. Hermann, 1905.

A first-class work giving mathematical treatment throughout to this branch of engineering science. The theoretical side of the subject is first discussed, and in the second part the practical application of these ideas and theories is treated. The practical part of the work is in most respects the same as in the first edition, but the theoretical portion has been changed in many important respects.

A Manual of the Principal Instruments used in American Engineering and Surveying. 446 pp. and Illustrations. W. & L. E. Gurley, Troy, 1905. (Price, $0.50.)

Describes and illustrates most of the instruments used in surveying and map-drawing and the methods of handling them in the field.

West Africa Before Europe and other Addresses Delivered in England in 1901 ane 1903. By Edward Wilmot Blyden. iv and 158 pp. C. M. Phillips, London, 1905.

Dr. Blyden has been called the most learned man of the African race. Born in the West Indies over 70 years ago, he was nurtured in European culture, but has spent nearly all his active life in Liberia, where, through the press, the school, and the pulpit, he has incessantly worked for the development of his race. The four addresses in this little volume—"West Africa," "Islam in the Western Soudan," "Some Problems of West Africa," and "West Africa Before Europe"—were delivered in England and elsewhere between 1901 and 1903. They are vigorous and eloquent, and, like his earlier books, show a man who is capable of deep thinking and is saturated with facts and ideas relating to his race and its native home.

Der Mensch. Sechs Vorlesungen aus dem Gebiete der Anthropologie. Von Dr. Adolf Heilborn. vii and 110 pp. Illustrations and Index. B. G. Teubner, Leipzig, 1904. (Price, M. 1.25.)

Professor Heilborn, in this little book, presents the principles of anthropology in popular language and adapts them for general reading without the sacrifice of scientific spirit or accuracy. The numerous small illustrations are excellent. Among the topics are our present knowledge of the origin of man, types of human form, anthropological measurements, the races, their anatomical differences, and Tertiary man.

Die ärtzliche Mission unter Heiden und Mohammedanern. Von Hermann Feldmann. 174 pp. Verlag der Missionsbuchhandlung. Basel, 1904.

An instructive book published with the assistance of the "Verein für ärztliche Mission" and designed to stimulate larger participation by German Missionary Societies in the medical feature of the work. The medical methods and results of the evangelical Missionary Societies in all countries are fully described. Facts are quoted to show the humanitarian aspects of this work and its usefulness in stimulating the growth of other departments of missionary enterprise. The German Societies have not adopted medical missions so largely as those of other countries.

Promenades Lointaines: Sahara, Niger, Tombouctou, Touareg. Par le lieutenant Paulhiac, membre de la Société de Géographie de Paris. Préface par M. Hugues Le Roux. Un volume in 8°. (Prix, 5 francs.) Illustré de cent photographies et de deux cartes en photographie. Librairie Plon Nourrit & Cie, 8 rue Garancière, Paris, 1905.

Lieutenant Paulhiac's excursions in the countries of the Sahara and the Niger, to Tombouctou and the Touareg had for their object, not discovery, but the study of the territory occupied. For the author the adventurous cycle of African exploration is closed, and it is now a question of rendering valuable and renumerative the immense empire hewn out by the swords of valiant French soldiers, his precursors.

The book begins with a comparative estimate of the area of the French possessions in Western Africa; not less than six times the size of France.

The climate is marked by excessive temperature. It has but two seasons—the dry, which commences in October and ends in June; the wet, beginning at the end of June and terminating in September.

Senegal is inhabited by the Yolofs and the Toucouleurs. The Yolof is indolent, but he has nevertheless rendered service to the colonists. The Toucouleur is rebellious and intractable. He loves war for its devastation, for rapine and loot; he despises work, is fond of palaver, perfumery, jewels, and good cheer. Because he is not so black as his fellows he considers himself their superior; he treats those under him with disdain, and reviles them as a race of captives.

The Toucouleur woman is tall and well formed, with regular features and delicate extremities. The Lieutenant regards her as graceful and beautiful, which leads to the conclusion that the Toucouleur is more Arab than negro.

The Peule is placid, pacific, and pastoral, half nomad, half sedentary; the nomads follow their flocks, changing pastures with the seasons and returning to

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the sedentary camps to exchange products, refit and again set out across jungle and desert. The Peule arms himself only for self-defence, and is a devoted adherent of the Koran.

The Bambara excites the admiration of the author; he is strong and muscular, with a big head, flat nose and thick lips, and built like a Hercules. The woman is of the same mould. The Bambara is tenacious, tractable, and a hard worker—qualities which make him an excellent slave and the victim of the predatory Toucouleur. The author believes that in the Bambara France possesses an element with which to achieve the prosperity of the Sudan.

The sons of the hostile chiefs, Yolof, Toucouleur, and Sarracolais, receive free instruction in the Government schools of Saint Louis and Kayes. The instruction is inefficacious, and the author suggests that schools be established in which agriculture shall be taught and that other instruction be discontinued.

The Moors and the Touareg inhabit the regions north of Senegal and the Niger. Both are of the Arab race, "rovers of the desert," and they pillage caravans as a profession.

The Moor is clean-shaven and bareheaded; the Moor woman goes veiled. The Touareg, on the contrary, is veiled, whilst the Touareg woman has her face uncovered—thereby a legend:

The Touareg, once less warlike than now, were attacked by a hostile tribe, and, retreating precipitately to camp, were reproached by their wives because of their cowardice. The women took up arms, attacked the enemy, and defeated him. Returning to the camp one of them tore her veil off and flung it in the face of one of the men. From that time until now the Touareg man has worn the *lithan* or veil, whilst the woman not only goes unveiled but sits in council with the men—a story which proves that the Woman's Rights Society discovered nothing new.

A chapter is devoted to the sanitary conditions of the Sudan, the insufficiency of food, the origin of diseases, and the native remedies employed; all of them very crude.

The author denounces the philosophy of Islam, which produces a civilization that is retrograde and decadent. He contrasts, absurdly enough, the progress of a half century in America with that of eighty years in North Africa by the French.

Lieutenant Paulhiac would combat the fatal influence of Islam by ruining the credit and authority of the *Marabout,* and this may be accomplished effectually by the Chiefs of Agriculture, taught and disciplined in the Colonial Agricultural School.

The author advises the construction of economical roads for animal traction tramways. He opposes the construction of an expensive Transaharan line, which is impractical, illogical, and ruinous. The Sahara is unproductive, and the Moors and the Touareg who dwell there have nothing to sell, nothing to buy. Commercially there is nothing in it; politically England, since the Convention of 1899, holds the Nile from its source to its mouth. As for the Touareg, France has only to hold the water sources and granaries to keep them in subjection.

The author concludes that the systems of colonization employed until now—1st, By companies; 2d, by colonial Administrations—are insufficient. He suggests the application, first, of the lesson inculcated in the maxim of the great Sully: "Ploughing and pasturage, the two great breasts of France;" the organization of Colonial Agricultural Schools, which shall teach the native almost exclusively the science of the cultivation of the soil; the construction of cheap roads of penetration; and inducements to draw the native scholars to the great commercial centres.

Thus the spirit of the Nigritian populations and the face of the country may be completely changed.

The duty before France is to devote herself to the task of creating in the Sudan a flourishing civilization based upon the principles of equity. To cite the final words of the author, the future depends upon *le travail, l'épargne, la justice et la paix dans l'amour de l'humanité*"—work, thrift, justice, and peace in the love of humanity. CH.-L.

The Faroes and Iceland: Studies in Island Life. By Nelson Annandale. vii and 238 pp., 24 Illustrations, Appendix and Index. H. Frowde, London, 1905. (Price, 4s. 6d.)

These studies were made during a number of summer vacations spent on the islands. They illustrate the people in their physical character, education, government, and occupations. The influence upon them of their geographical environment is not strongly denoted. The author says that though the inhabitants of the Faroes are in-bred to a large extent, he has found no proof that this has resulted in moral, mental, or physical degeneration, unless possibly it may have produced some diminution in stature. The illustrations give striking aspects of the islands and the occupations of the people. The ravages of Turkish pirates from Algeria in the seventeenth century are described, and there is an appendix on the Celtic pony.

Das Riesen- und Isergebirge. Von P. Regell. 132 pp., 89 photographs, map in colours, and index. Velhagen & Klasing, Bielefeld and Leipzig, 1905. (Price, M. 4.)

The beauty and picturesqueness of the mountains on the border between Silesia and Bohemia, with their valleys, hamlets, towns, waterfalls, and people, are described in the entertaining manner and with the wealth of photographs which have made the high reputation of the "Land und Leute" Series, of which this volume is number XX. Some of the photcgraphs illustrate important industries, as glass-blowing, wood-carving, etc.

The Configuration of the Rock Floor of Greater New York. By W. H. Hobbs. *Bulletin* No. 270, U. S. Geological Survey. 1905. 96 pp.

In his letter of transmittal to the Director, Mr. C. W. Hayes comments on the importance to local engineering and construction of the data contained in this report. Professor Hobbs pays tribute to the precision of some of the older maps, notably those of Randall, 1811-1821, and of Viele, 1874. Here at the present time is a centre of engineering enterprise more extensive than is elsewhere known to history, and now is the opportunity to seize upon facts which would otherwise be forever lost. There is a review of authors, with notes on their conclusions and discriminating references to the value of their work. Among these are Gale, Stevens, Newberry, and Dana, of the older generation, and Kemp, Merrill, Eckel, Gratacap, Julien, Peet, Russell, and the writer of the present Report.

Much of the structure of Manhattan is confidently stated to be the result of normal faulting. Maps of southern and northern Manhattan are presented, on which, in blue, are given the contours of the bed-rock surface. The maps show also the position of wells that reach to the rock floor, with the depth of that floor as referred to mean tide at Sandy Hook. A further symbol distinguishes borings that do not reach bed-rock, their bottoms being compared with the same datum.

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It is now well understood that the East River lies in a rock cañon nearly 200 feet deep, and the North River in a cañon of even greater depth, 300 feet or more. These cañons are now, of course, filled in part with drift and silt. Gale's statement is approved, that Manhattan consists of "gneissoid islands" separated by low areas of drift. The largest of these islands occupies the central part of Manhattan, and several smaller ones lie to the north.

Detailed transverse sections are given, especially as made possible by the work of the Pennsylvania and Long Island Railway Companies, including the North and East River tunnels and the operations around the terminal site. There are sections approximating the lines of 31st, 32nd, 33rd, and 34th Streets. The data are afforded by 90 well-distributed core borings and about 75 intermediate wash borings.

The steep western wall stretches not only from Manhattanville southward to 81st Street, but continues still farther south along the pierhead line. The eastern wall is even steeper than the western. In a manner equally fortunate for our knowledge of the rock foundation of the island, we have the series of borings made longitudinally by the Rapid Transit Commission. The profile thus developed shows abrupt changes of level south of Union Square, the greatest depression occurring at Duane Street, where the floor is at a depth of 163.25 feet. North of Central Park, as far as 145th Street, rock was not encountered in tunnelling, but at the latter point a descent was made, to pass under the Harlem River, and limestone was penetrated.

In the opinion of the author a sunken block of gneiss and limestone lies beneath the Harlem flats, outlined on the west by a fault along Eighth Avenue, and on the south by a fault marking the northern wall of the Manhattan uplands, at the upper end of Central Park.

About two-thirds of the *Bulletin* are filled with a tabular record of 1424 borings. The tables furnish the location and the depth to bed rock both as given and as referred to U. S. datum at Sandy Hook; also, where known, the kind of rock. Footnotes in many cases give further details, and the whole affords permanent information of much value. A. P. B.

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* In the map of Lago Titicaca on page 451 the latitudes should read, from top to bottom: 15, 16, 17.

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